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17. ABSTRACT (MAX. 250 WORDS) It is not yet known how the extent of language differences between lower class children and teachers with middle class training and, for the most part, with middle class backgrounds, influences classroom communication. An evaluation was made of the expressive linguistic skills and speech content of children of different ages, races, and social class backgrounds and of the extent to which information is successfully communicated from teachers to pupils and among pupils. Findings have the following implications: 1) Children disadvantaged by conditions related to social class status and/or minority group membership require special training in such language areas as vocabulary development, general ease in self-expression leading to lengthy but meaningful verbalization, greater exactness in sound discrimination and in precision in the use of language. 2) Research shows the close relationship between intelligence, as measured by standardized IQ tests, and language skills. Previous studies suggest that improving language skills can raise IQ scores. 3) Different subgroups of first grade children tend to be more similar in their general language functioning than are subgroups of fifth grade children. It would seem important to emphasize development at as early an age as possible.							
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**Communication of Information in the Elementary
School Classroom**

Cooperative Research Project No. 908

**Martin Deutsch
Alma Maliver
Bert Brown
and
Estelle Cherry**

**Institute for Developmental Studies
Department of Psychiatry
New York Medical College
106th Street and 5th Avenue
New York 29, New York**

1964

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I. Statement of the Problem

Language is a central factor in school performance, both in the major interpersonal communication function of language, and in its intrapersonal mediational function in problem solving.

With the exception of a very few children such as those described by Goldfarb (1945) and Dennis (1960), children grow up in a veritable sea of language. Various subcultures use language differently with respect to children, however. In some, it is assumed that the child is a participant in verbal interaction, and he may be the focus of a good deal of conversational activity. In other groups, the orientation might not call for frequent verbal response, and the child may be rarely attentive to or included in the conversational matrix. These different language atmospheres may have been functional for the subgroups they represent and consistent with their unique histories. Yet, nearly all children in a given city go to a school system reflecting the orientation of the dominant socio-cultural group. The problem is that, obviously, whether the different atmospheres are based on cultural or socioeconomic factors, they result for children in both differential acquisition of language facility and in variations in performance on language-related tasks. Primary here are the language requirements of the school as they relate to communication and comprehension and, eventually, to such specific skills as reading. For example, the influence of the teacher obviously will be dependent on the child's prior experience in handling "lengthy" verbal statements.

This would include both the child's receptive understanding and his expressive ability.

The work of investigators such as Young (1941), Irwin (1948), Anastasi (1958), and Templin (1957) has shown that the structure of the language system which an individual acquires is related to background features associated with social class, such as occupation, education, and the like. Bernstein (1962) has further emphasized these relationships in his discussion of the existence of different language systems in middle and in lower class groups. He refers to the former as an elaborated system, in which the probability of predicting the pattern of organizing elements in a language sample is reduced, as the speaker will select from a relatively extensive range of alternatives. Lower class speech, he says, is characterized by a restricted code, in which the number of alternatives for the speaker is limited, and, consequently, the probability of predicting the pattern is greatly increased.

Recognizing that there are socially determined differences in children's language patterns raises the question of what their influence is on the learning process. It would seem desirable to know more about the structure of children's language. It might be that the child even has two simultaneous systems, one reflecting the larger mass-media influences, and the other reflecting the culture of his specific subgroup. In addition, it would be relevant to explore the relationship of speech patterns to intelligence test and achievement scores, and to investigate the interrelationships among some of the

components of children's language patterns. One way of accomplishing this would be to reduce to a minimum the inhibiting or facilitating influence of the teacher or the tester in the situation in which expressive language samples are obtained. Another method would be to use the dialect of each child's own group as the stimulus material to measure his language performance. Both these methods were used in the present study, in which the purpose was to evaluate children's abilities to express themselves meaningfully and to comprehend the language of their teachers and peers. More specifically, it was intended to evaluate (a) the expressive linguistic skills and speech content of children of different ages, races, and social class backgrounds and (b) the extent to which information is successfully communicated from teachers to pupils of these different backgrounds and among such pupils.

It is not yet known how the extent of language differences between lower class children and teachers with middle class training and, for the most part, with middle class backgrounds, influences classroom communication. The tendency of the lower class child to be inattentive in school is often seen as an example of poor motivation. Instead, it may be that comprehension is severely limited by the demands of a situation in which instruction is geared to the listening habits and patterns of middle class speech. The lower class child does not have the same background, in range or intensity, of verbal interaction with adults as does the middle class child.

It is not known what effect this may have on the basic channel of communication in the classroom, namely the teacher's verbalizations to her pupils.

Because of the redundancies inherent in any language, parts of a speech sequence can be anticipated even if the listener's attention level has fluctuated considerably. Rarely does each word in a sequence of speech prove necessary for the transmission of new information. A child's comprehension and learning depend, in large part, on his abilities to substitute, from context, meaningful words for those not heard or unfamiliar to him. The ability to make these tacit predictions is related to a series of language variables: active vocabulary, grasp of the complexities of language structure, familiarity with the general context of the material and the like.

The present study represented, in part, an effort to survey the language skills of the intellectually normal but socially disadvantaged child. Particular emphasis was placed on the range of his oral vocabulary, his linguistic skills, and his ability to understand others' communications. Included in the study were groups of Negro and white boys and girls of differing social class and age levels in order to evaluate the relationship between background and developmental characteristics and particular language abilities. While special emphasis was placed on expressive language, the study included an evaluation of receptive language skills through the assessment of the child's ability to comprehend language.

II. Objectives

The research reported herein was designed to explore the relationships between background factors and certain linguistic skills in children. Included were both expressive and receptive language studies.

The major objectives of the study of expressive language were to evaluate the expressive linguistic skills of children of diverse social and ethnic backgrounds. Samples of children's continuous speech were evaluated for both their formal and structural characteristics and for their content.

The primary objectives of the study of receptive speech in children were to evaluate the extent to which information is successfully communicated from teachers to pupils of diverse social backgrounds and the extent of effective communication among children of diverse social backgrounds.

In this investigation of children's language, expressive language samples consisted of verbalizations elicited from the children in a relatively unstructured speech reinforcement situation. Receptive language was measured by the children's single word constructed responses on a highly structured sentence completion task.

The subjects in the research included Negro and white boys and girls of two age levels and of varying social class backgrounds, in order to permit investigations of the relationship of these demographic and developmental factors to various linguistic abilities. These evaluations constituted further major objectives of the research.

III. Related Literature

The literature on the function and development of language in children is extensive, and no attempt will be made here to survey the field in detail. An excellent summary of the literature can be found in McCarthy (1954), and other major concepts and discussions of research studies have been presented by Anshen (1957), Osgood and Sebeok (1954), and Saporta (1961). Some of the major findings on the relationships between language and the age, race, sex, and social class variables employed in the present study are given in the following sections. References to previous studies of specific linguistic measures are included in the subsequent sections on scoring the expressive language data of the research.

Language and Environment

Studies of children's language have given only tacit recognition to the fact that the child learns the kind of language spoken by his parents. Carroll (1961) indicated that a crucial methodological weakness of research in the field has been the assumption that there is a single standard set of word sounds which all children attempt to imitate. McCarthy's (1954) summary of research on language development emphasizes the linguistic environment provided by the family setting as the most important external influence on the child's learning of language. Early studies were primarily contributions to the normative aspects of language development (M.K. Smith, 1941; Gewirtz, 1948), although many investigators

attributed variations in language development to differences in socioeconomic level (Fisher, 1934; E.A. Davis, 1937a).

Milner (1951) found that differences in the amount of time children spent talking with adults and the amount of overt affection the children received significantly affected language facility. At the same time, she found that variations in these aspects of living were associated with differences in social class level.

It has been well established that special environments have a marked effect on language development. Institutionalized children were found to be retarded in vocabulary, in ability to form complex sentences, and in facility with abstract concepts (Little & Williams, 1937; Fleming, 1942; Goldfarb, 1943; Brodbeck & Irwin, 1946). Children who attended a day nursery school program have been shown to advance in language beyond matched peer groups in a residential nursery (Kellman Pringle & Tanner, 1958). Dawe (1942) matched pairs of orphaned children for age, sex, and intelligence and administered a language training program to the experimental group. She obtained significant changes on all language measures and on IQ test score as well.

The environment of a large family appears to affect child language development adversely (McCarthy, 1930) as do the situations of being one of twins or triplets, etc. (Day, 1932), or having a handicap in vision or hearing (Hawk, 1937; Heider & Heider, 1940). Special experiences, such as trips and vacations, have been found to

be powerful tools in strengthening certain areas of language (Drever, 1915-1916; Bean, 1932). These last mentioned research studies generally share the common defect of not controlling the variable of social class level, however, so that the findings must be interpreted with caution.

Several researchers have studied the effect of the type of testing situation on length of response. Young (1941), using four environmental settings which varied from an unsupervised outdoor play situation to a supervised indoor play situation, found no significant differences in length of remarks with change of setting. Hahn (1948), however, reported that the longest sentences occur in the freest settings and in situations that engage the child's attention.

Developmental Trends

Early workers in the area of language have carefully noted the successive stages in the development of speech from the earliest vocalizations of the infant to the 2 year old's use of the elaborated sentence. Studies represented by the work of McCarthy (1930), Fisher (1934), E.A. Davis (1938), Irwin (1941), Young (1941), Templin (1957), and others provide the normative data of developmental changes in articulation, in the distribution of parts of speech, and in sentence complexity. The zealousness of these researchers did not end with the appearance of the first faltering sentence uttered by the young child, and normative studies of language through the high school years have been accomplished by these workers. The results of these studies indicate a progressive mastery of verbal

skills as reflected in growth of vocabulary and increasing complexity of sentence structure.

The single most comprehensive study of child language is one conducted recently by Templin (1957). Approximately 500 children, 3 to 8 year olds, representing upper and lower class boys and girls equally at each age level, participated in the research.¹ Using speech measures she had developed, Templin found that the general accuracy in articulation of sounds by 3 year olds was approximately 50 per cent of the accuracy of the 8 year olds. Correct articulation of vowels and diphthongs was achieved earliest; correct triple-consonant blends developed latest. By the age of 8, mature articulation was developed by most children. The greatest increment in sound discrimination occurred between the ages of 3 and 5; by 8 years of age the children reached the ceiling on Templin's test of this ability.

The mean length of remarks (50 utterances in the presence of an adult) of 8 year olds was over twice that of 3 year olds. Templin's data indicated that the length of utterances was still increasing at the oldest age level examined. The measures of parts of speech showed no proportionate changes with age, with the speech of

¹Templin's subsamples at each age level were matched for ratings of the father's occupation according to the Minnesota Occupational Scale. The social class data obtained in this way are discussed later in this chapter under the heading of Language and Social Class.

3 year olds already reflecting the basic grammatical structure of the language. Templin found that the grammatical accuracy of 3 year olds was approximately two-thirds that of the 8 year olds. Children in the 8 year old group were found to be still progressing in the area of complexity of grammatical construction.

In vocabulary development Templin found that recognition of words (Ammons Full-Range Picture Vocabulary Test; Seashore-Eckerson English Recognition Test) was still developing in the 8 year olds. Vocabulary of use was evaluated through the number of different words in the 50 utterances and through the sound discrimination vocabulary. On these measures a similar, but less clear-cut, trend appeared as was obtained for the vocabulary recognition measures.

In patterns of growth in sentence length, complexity, and in the use of various parts of speech, Templin's findings concur with the results of previous studies (Gesell, 1925; M.E. Smith, 1926; Gesell & Thompson, 1934; E.A. Davis, 1937b; Gesell, Thompson, & Amatruda, 1938), although only one study, Gesell's, parallels Templin's in the evaluation of the same children at successive ages. The outstanding difference appeared in respect to quantity of speech in child-adult situations. Templin found greater loquacity and more mature language than has been reported in previous studies (McCarthy, 1930; E.A. Davis, 1937a).

Both McCarthy (1930) and Templin have reported that younger children use more verbs than nouns and that the proportion of nouns to verbs increases from 3 to 8 years of age. Young (1941) found

that pronouns and verbs constituted 55 per cent of total speech in children from 30 months to five and a half years. Verbs and nouns have been found to appear earlier than their modifiers (adjectives and adverbs).

In many studies of children's language, length of sentence has been found to be a measure of maturity in the use of language. McCarthy (1954) described the mean length of children's sentences as being the single most reliable, objective, easily scorable, qualitatively significant, and comprehensible measure of linguistic maturity.

The mean sentence lengths reported by Templin in her 1957 study were considerably longer than those reported 20 years earlier by McCarthy (1930) and E.A. Davis (1938) in closely comparable testing situations. Perhaps modern children have greater language facility because of increased verbal stimulation and greater permissiveness in child-adult relations. The reliability and objectivity in studies that use sentence length as a measure of language maturity must be carefully appraised, however, in view of the sensitivity of the measure to the type of testing situation and to the rapport between the examiner and the child.

The degree of coherence the child achieves in organizing his speech can also reflect language facility and maturity. The dimension of language coherence can be evaluated by analyzing the relationship of dependent to independent clauses in a language sequence, i.e., the amount of subordination (LaBrant, 1933). LaBrant and, more recently,

Loban (1961) and Strickland (1962) found that chronological age showed a higher degree of relationship with the use of subordination elements than with any other language measure. Loban has pointed out that the use of subordination is associated with grammatical complexity and with over-all language proficiency.

Sex Differences

It has been customary to view girls as superior to boys in language development as a result of such studies as those by McCarthy (1930), Day (1932), Fisher (1934), Smith (1935), E.A. Davis (1937b), Jersild & Ritzman (1938), Young (1941), Shire (1945), and Loban (1961). These studies have shown girls, as compared with boys, to articulate clearly at a younger age, to speak in sentences earlier, to be superior in word usage, sentence complexity, and grammatical correctness, to use less slang, to have a more extensive vocabulary at the younger age levels, and to be more talkative. Sex differences favoring girls have also been found to be more prominent in lower social class groups (E.A. Davis, 1937b; Young, 1941).

Two notable exceptions to the general finding of the language superiority of girls are found in the work of Anastasi and D'Angelo (1952) and in the study by Templin referred to previously. The former study found Negro boys to surpass Negro girls in complexity of sentence structure and in length of response. Templin found that girls tended to earn higher scores more often than boys did on the language measures she employed in evaluating the entire age range of her sample (3 to 8 year olds). The differences were not

consistent, however, and rarely were significant. At the separate age levels few significant differences were obtained. Girls did tend to be superior in articulation, and boys in word knowledge. Templin concluded that the differences between the sexes are less pronounced now than they were 25 or 30 years ago when the initial studies in language development appeared. She suggested that differences in the language abilities of boys and girls have narrowed as a result of a tendency to follow a single standard in methods of child rearing during recent decades. However, others would argue with this explanation on the basis that there are clear differences in child rearing practices toward boys and girls (Murphy, 1962).

Language and Race

The data which exist on racial differences in language skills point to universal developmental patterns and few statistically significant differences. Loban (1961) found that Negro subjects, who, unfortunately, comprised only 11 per cent of his total sample of over 300 children, had particular difficulty with the verb "to be." Although Loban made more than 26 comparisons between subgroups, this is the only statistically significant difference between racial groups he obtained.¹ The study by Anastasi and D'Angelo (1952), referred to in the previous section, compared 50 Negro and 50 white

¹One significant finding among 26 comparisons would be expected if sheer chance were operating and if the .05 confidence level were used.

subjects. Subgroups were equated for sex, social class level, and parental occupational level. On comparisons of sentence complexity and length, the white group proved superior to the Negro group but not to the point of statistical significance.

Language and Social Class

Differences in the linguistic skills of children of diverse social class groups have been shown to be greatest where the group differences in social class level are most extreme (McCarthy, 1930; Day, 1932; E.A. Davis, 1937a; Schulman & Havighurst, 1947; Irwin, 1948; Templin, 1957). The studies have revealed significant differences between the group mean scores of the various social class groups in such areas as: complexity of sentence structure; certain articulation skills; length of sentences and remarks; size of vocabulary.

Bernstein describes the linguistic pattern of the lower class child, in general, as follows:

Such children will experience difficulty in learning to read, in extending their vocabulary, and in learning to use a wide range of formal possibilities for the organization of verbal meaning; their reading and writing will be slow and will tend to be associated with a concrete activity-dominated content; their powers of verbal comprehension will be limited; grammar and syntax will pass them by; the prepositions they use will suffer from a large measure of dislocation; their verbal planning function will be restricted; their thinking will tend to be rigid--the number of new relationships available to them will be limited (1961b, p. 165).

Studies by McCarthy (1930), E.A. Davis (1938), and Templin (1957) have indicated a trend towards more functionally complete remarks

among lower class children and a trend towards more complex and elaborated remarks among middle or upper class children. Templin's detailed study of the interrelationships between social class level and various linguistic skills was based on children rated as upper or lower class on the basis of the Minnesota Occupational Scale which classifies the father's occupation. The Ammons Full-Range Picture Vocabulary Test and the Stanford-Binet Test were used to rate the intelligence of the 3 to 6 and 6 to 8 year olds, respectively. The language measures included several vocabulary measures and sound discrimination and articulation tests constructed by Templin. In addition, 50 verbal utterances in the presence of an adult examiner were rated for sentence length, complexity, grammatical accuracy, and parts of speech.

In every language skill measured, Templin consistently found significantly higher scores in the upper than in the lower socioeconomic groups; moreover, the differences between groups were usually statistically significant. The differences were mainly in the areas of articulation of vowels, medial and final consonants, grammatical complexity, and recognition vocabulary among the older children, with the greatest number of significant differences occurring at the 4.5 age level. At every age tested, the upper SES groups used longer sentences. Templin pointed out that the level of intellectual ability of each socioeconomic group was also significantly different and that some of the results probably

reflect this factor. But she stated, "It should be recognized, however, that the linguistic environment provided by USES (upper class) and LSES (lower class) homes is likely to vary and that the correlation between intelligence and the several language skills is not consistent" (Templin, 1957, p. 147).

In her concluding remarks, Templin emphasized the need for future research in language to investigate further the impact of the social and cultural environment on language development. Carroll (1961), in summarizing the research on children's language, stressed the need for additional study of the developmental aspects of language structure. He specified, in particular, the need for experimental studies of children's language development in which the speech stimuli, as well as the responses, are analyzed. The present investigation was an attempt to evaluate, in both relatively unstructured and structured test settings, children's expressive and receptive language from the points of view of structure, content, and comprehension.

IV. Expressive Language Study

This study of expressive language, that is, relatively spontaneous verbalizations, was designed to evaluate specific aspects of both the linguistic skills and the speech content of children from three different socioeconomic groups. In addition to using a social class variable, subgroups of first and fifth grade Negro and white boys and girls were used in order to explore certain developmental, race, and sex influences.

The Subjects

The subjects who participated in the study were first and fifth grade pupils from 12 New York City public schools. In order to evaluate selected aspects of expressive speech of school children, subjects were chosen to represent various combinations of the two school grades, three socioeconomic levels, race (Negro and white), and sex. The original design of the research called for a minimum of five subjects within each cell. Limitations of time and availability of pupils resulted in some variation from the desired cell size. The final sample consisted of a total of 167 children.

The social class level of each subject was determined by means of an Index of Socioeconomic Status.¹ The cooperation of the schools made it possible to gather the necessary background data on each

¹The Index of Socioeconomic Status was developed at the Institute for Developmental Studies. The specific procedures for assigning SES ratings to subjects and a description of the method used to develop the Index are presented in Appendix I.

child, although the primary source of information was a mail questionnaire sent to each subject's parent or guardian. The Index has a 10 point range, and on the basis of the education and occupation of the family breadwinner, each subject is assigned a rating on the continuum. The Index was developed on data from public school children, and the range does not cover the highest social strata in society.

Three social class groupings were evolved and categorized as lower class (SES I), intermediate (or lower middle) class (SES II), and middle class (SES III). The SES I household is characterized by a main wage earner whose educational attainment ranges between elementary school and the ninth grade, and one who is unemployed, holds an unskilled or semi-skilled job. The main wage earner at the SES II level is likely to have an education ranging between the seventh grade and high school graduation, and holds a clerical, sales, or skilled job. The SES III household is characterized by a main wage earner whose education ranges between high school graduation and college graduate training, and who is employed in a skilled job or in a professional or managerial capacity.

The number of subjects within each cell is shown in Table 1.

TABLE 1.--Expressive Speech: Distribution of
Subjects by School Grade, SES, Race, and Sex

	<u>SES I</u>		<u>SES II</u>		<u>SES III</u>	
	Negro	White	Negro	White	Negro	White
<u>Grade 1 (N=62)</u>						
Male	7	6	8	9	2	8
Female	3	6	4	1	4	4
<u>Grade 5 (N=105)</u>						
Male	7	8	10	7	8	9
Female	16	11	8	7	5	9

Procedures

The subjects of the research were selected from schools located within neighborhoods serving the various social class and racial groups required by the design of the study. Each subject was tested by a trained examiner on the school premises in rooms set aside for the purpose. Information on the general intellectual, reading, auditory discrimination, and language abilities of the subjects was obtained as follows:

Intelligence

The Lorge-Thorndike Tests (1954a), Form A, Level 1 for the first graders and Level 3, Nonverbal, for the fifth graders, were used to measure intelligence. The test was presented to groups of 15 children.

Reading

The Gates Advanced Paragraph Reading Test, Form I (1958), was administered to all fifth graders. The subjects were tested in groups of no more than 15 children at one time.

Auditory Discrimination

The Wepman Auditory Discrimination Test (1958), designed to measure the accuracy of the child's ability to perceive differences between similar stimuli (i.e., words), was administered individually to each first and fifth grader by means of pre-recorded tapes.

Language Testing

In order to assess aspects of the verbal skills available to the child, a technique for obtaining continuous speech samples was required. Descriptions of the methods used with the first and fifth graders are given below:

The Clown Technique

For the children of the first grade age level the apparatus used consisted of a somewhat larger than life-size papier-maché head of a clown whose nose was a small red electric bulb that could be lit by the examiner (S. Salzinger et al., 1962). The clown head was placed in a large red box on a table in front of a screen which separated the clown display from both the light switch controlling the clown's nose and from recording equipment on the other side of the table. A microphone was hidden in the display,

and a tape recorder was used to record the child's speech.

Instructions were administered to the child by means of the tape recorder, also, though there was always an examiner in the room.

The administration procedure was as follows: As an introduction to the situation, the child was brought into the experimental room and read an illustrated story about the clown. He was then introduced to the clown, whose name was "Happy," seated before the display, and told to wait for the clown to speak to him. The examiner went behind the screen and played taped instructions that were part spoken, part sung. The clown instructions (recorded by a member of the Institute's research staff) told the child that speaking to the clown would make the clown so happy that his red nose would light up. The child was told he could talk about what he would like to be when he grows up, about his friends, what he does in school, or anything else he would like to talk about. The "voice" of the clown also asked the child what his name was; if the child failed to answer, the examiner moved to the side of the screen and encouraged the child to "tell Happy your name."

As soon as the taped instructions were finished, the examiner told the child that he could begin talking. The examiner simultaneously timed the child's speech and turned on the switch that lighted up the clown's nose. As soon as the child stopped talking, the examiner turned off the light switch. Thus, reinforcement followed the child's speech. If the child were silent for more than ten seconds, the examiner gave a standardized probe: "Can you make the

clown happy? Try." When five minutes elapsed, the examiner terminated the test by telling the child that he had indeed made the clown happy.

The Rocket Technique

The Rocket technique was designed at the Institute for Developmental Studies to stimulate the interest of older children. Parallel to the Clown technique in administration, the apparatus consisted of a "sky" board, so named because of its blue color, and a small replica of a rocket wired to a battery concealed behind the board. The rocket, to which a red tail light had been fixed, was controlled by the examiner who stood behind the board and simultaneously tape recorded the child's speech. As the child spoke, the rocket moved up the board toward the "moon," a white plastic sphere at the top of the board.

The child was told that the object of this game was to get the rocket to move toward the moon and "all you have to do is to talk." The examiner suggested topics to talk about--the same topics suggested to the first graders. Similarly, the child was told that "Whenever you talk, the rocket's tail will light up and it will move toward the moon."

The examiner then went behind the rocket panel, started the tape recording, and told the child to begin talking. As soon as the child spoke into the microphone mounted in front of the panel, the examiner switched on the tail light with one hand and with the

other operated a gear switch that caused the rocket to rise. Whenever the child stopped talking, the examiner turned off the tail light and threw off the gear switch, thus stopping the rocket's movement. Again, reinforcement followed the child's speech. If the child were silent at any time for more than ten seconds, the examiner used a standardized probe: "Can you make the rocket light up and move toward the moon?"

The rocket's movement was calibrated so that it would reach the moon if the child spoke for exactly six minutes. Although a maximum of ten minutes of recorded time was allowed (in order to give the child a fair amount of time to experience the rocket's arrival at the moon), the speech of only the first five minutes of time was analyzed in order to get speech samples comparable in length to those elicited by the Clown technique.

The early studies on child language, which resulted in a large descriptive literature, derived their speech samples from such naturalistic settings as story telling, playing with toys, etc. Young (1941) realized the need for a more precise and standardized methodology for sampling children's speech and attempted to ascertain the variations in language that accompany a change in environmental settings.

More recently, Brown and Berko^o (1960) have begun to use psycholinguistic theory as the basis for experimental methods of eliciting verbal behavior from children. K. Salzinger (1959) and

K. Salzinger and Pisoni (1960) have used operant conditioning techniques to manipulate verbal behavior with schizophrenics and normal subjects. These attempts to introduce an experimental approach to the study of verbal behavior have proceeded from a framework in which theory specified the variables to be explored. In contrast, the earlier studies derived their variables and units of analysis from empirical work.

The technique used in the present study for obtaining continuous samples of children's speech stems, in part, from both traditions of language study. The Clown technique originally evolved as a method of conditioning different types of language behavior through reinforcement (S. Salzinger et al., 1962). To obtain the continuous sequences of speech reflective of children's expressive language patterns within a particular standardized situation for the purposes of the present study, the reinforcement schedule was eliminated.

Clown and Rocket administration manuals are shown in Appendix II. The procedures for transcribing the speech samples and excerpts of Clown and Rocket protocols obtained from subjects representing the extremes of the major variables of IQ, SES, race, and grade are presented below. The language variables scored for the Clown and Rocket data are specified in detail in Appendix III.

Transcribing the Data

The tapes of the speech samples elicited by the Clown and Rocket techniques were transcribed according to the following rules:

1. The child's speech was transcribed without punctuation, yielding protocols uncluttered by breaks which would interfere with a structural analysis.
2. The transcriptions did not take into account the child's pronunciation or articulation, since the research was not focused on phonemic patterns or dialect. Everything the child said, including such fillers as "uh" and "er," was transcribed.
3. Protocols were timed, and a note was made of the one minute and five minute intervals in each child's speech sample.
4. Pauses longer than ten seconds were noted by a series of dots; incomprehensible words were indicated by dashes.

Excerpts of Clown and Rocket Protocols

The eight excerpts below represent selected speech samples obtained from the Clown and Rocket procedures for first and fifth graders, respectively. Within each grade, the protocols represent Negro and white subjects from the extremes of the social class subgroups employed in the research, i.e., SES Group I (lowest) and SES Group III (highest).

No effort was made to select protocols according to sex, but male and female subjects are represented equally. Each excerpt consists of approximately 100 words selected so that the subject's meaning was retained.

At the first grade level it can be seen that the protocols of the lower social class children differ markedly from those of the middle class children. Compared to the middle class boy

(protocol 3), the lower class boy (protocol 1) used more self-referent pronouns, fewer different verbs, less complex verb stems, and the speech was organized at a much simpler level. The middle class subject told a story well known to him which immediately aided him in producing well organized speech, since a familiar story represents habituated speech. While the middle class child may have a larger repertoire of stories, the lower class child was not constrained from story telling despite the possibility of his having fewer at his disposal. Protocols 2 and 4 show similar differences in variety of verbs, complexity of verb stems, and speech organization.

At the fifth grade level the speech content and range of vocabulary and verbs tend to identify the social class membership of the subjects.

First Grade

1. SES I, White Male, IQ 102

I play in school and I and I color and I write and I read and then after I read I get my coat and go home that's all and when I go home I gets off and then I play with friends and then I go somewhere to skates with the skates and then I go upstairs and then I eat supper and then I go down again and then I buy something and then I go upstairs I watch television and then I go to bed and then in the morning I eat breakfast and then in the afternoon I go to school and I do the same things what I did then I sit in the auditorium and sometimes I play records.

2. SES I, Negro Female, IQ 102

What makes you so happy all the time how can you talk with your nose you're a nice fellow you ever been in in the circus you ever been a clown in the circus how'd you get them rosy red cheeks and your lips are red and your eyes are blue and your eyebrows are brown what's that little thing you got down there like here like presents you like everybody to play with you.

3. SES III, White Male, IQ 107

Once upon a time there was a little boy and his name was Jack and they were poor and his mother told Jack to go sell the cow for some money and then Jack sold the cow for some beans and on his way home he dropped the beans into a hole and then a big beanstalk grew and he climbed up and he came to a big big castle where the giant lived and he found a chi- a chicken that lay golden eggs and he wanted to try to get it so they be rich so then he tried knocking on the door and see who would answer.

4. SES III, Negro Female, IQ 110

Well I in school I know a little girl and she went to school with me in kindergarten and I used to know her since I was in kindergarten and we used to be so good friends then one day I went to see Pinocchio with her and we met another one of my school friends and she had one of her friends and so then her friend came with her and her brother and then her friend's brother so then she won a prize and at the end of the show they give

everybody something to color and then one Saturday I went to Palisades.

Fifth Grade

5. SES I, White Female, IQ 92

When we're bad in the classroom we have to put our hands on our heads and when Mr. Prager goes out of the room all the boys start making noises the whole class rather makes noises and he comes back and he doesn't say nothing well when Mr. Prager knows that we're being bad or something and he doesn't know he doesn't say anything about it he puts people out of the room for doing nothing like he put two girls out of the room last week for um for tying their shoelaces and plenty of things happen in the class.

6. SES I, Negro Female, IQ 90

I come to school in the mornings then I go in the yard to get ready go up go in the classroom and by eight-thirty I come to school and eight-thirty is over bout quarter till nine we start going upstairs and at nine we get upstairs then we get in the room we take off our coats we first we see which class which one goes which line goes in first so the first line that goes in gets in first the girls or the boys then after that we hang up our coats or some kids run to the water fountain to get some water.

7. SES III, White Male, IQ 97

Discover what things there are there and all see what happens in the universe my friends and I were playing ball last Monday and the team won 23 to 10 I was on the team that lost which had 10

I made a home run some a couple of singles and double today we might have a game which are the sides I don't know which it's gonna be say there the moon is neuter we might reach the moon after a while when scientists discover what possibilities might happen on the moon the moon will be probably be interesting to see if man will reach the moon if he does I would like to go on the moon and see what things there would be up there.

8. SES III, Negro Male, IQ 96

I like to uh uh learn about space and rockets and stuff like this and the moon doesn't look that way it has craters and stuff scientists say that Mars is the only planet in the solar system that would support life besides the earth and I think they're right because they think that there's vegetation on Mars it has uh two magnetic poles it has uh things that are similar to earth.

The speech samples which follow were taken from Negro and white first and fifth grade subjects. The protocols were given by children who obtained Lorge-Thorndike Intelligence Test scores at the extremes of the continuum representing the total research sample.

At the first grade level the age group, in general, gave repetitious material and took a relatively concrete approach with an expected awareness of the Clown. The children with higher tested IQ scores tended to give more elaborate productions and demonstrated a better grasp of cause and effect than did the lower measured IQ group. The fifth graders' Rocket productions often dealt with the

same content given by the younger children. However, the children with higher IQ test scores tended to give a wider range of vocabulary and content, more detail, more complex sentence structure, and more original content rather than mere repetition of familiar material, compared to the children with lower IQ test scores.

First Grade

9. SES II, White Male, IQ 81

Well one day my friend was by the beach and I was by the beach and my friends Jim and Joe they wanted to find me by the beach so Joe found me but Jane was looking in a different place they went one of them went that way and that way and then Joe found me and then me and my father and Joe not my father me and my cousin Janet went into the water alone and then we were in the water and then we went out of the water and then their mother Beebe was finding Joe first and think they found Jane first and then they found Joe and then we went someplace by the police and then Beebe came and found Joe.

10. SES II, Negro Male, IQ 80

You make funny noise you make funny mouth and you make funny tears and you make funny house and you make funny eyebrows and you make funny things like a eye you a good clown you or you you went be the happy happy clown you so happy today he is big clown you so big you almost turn to a funny little baby clown you is so happy you might jump out the big window you look

funny funny funny to me you is very and funny you is funny
funny funny clown.

11. SES II, Negro Female, IQ 119

A little girl came along and her name was Goldilocks she
knocked on the door but no one didn't answer so she opened the
door and on the table was three bowls papa's and mama's and baby's
sister first she tried all of them but all of them was too hot
she tried two but they was just right so those two she ate all
up then she went to sit down one chair was too high one was too
soft one well both of them was nice so she only set in one and
soon it just crashed so she was getting getting too dead sleepy
so then there was a bed upstairs.

12. SES II, White Male, IQ 130

Sometimes when there was a little boy he always used to go out
and play with some children and then when he always used to go
back in his house he wanted to go to the bathroom so when some-
times when he does that his mother got mad because she didn't
want him to keep on walking in and out of the house and then
finally she saw him one day foolin with some matches so she took
'em away and she spanked him then she put it so then that day his
mother said you couldn't get it so then that day his mother said
you couldn't go out you were a bad boy yesterday.

Fifth Grade

13. SES II, Negro Male, IQ 64

I go to this school P.S. 144 and I'm in 5-4 my teacher's Miss Sacks

I have a lot of friends in this school and in other schools this is a nice game I am playing and I'm glad to be playing it and I hope I'll get promoted to the sixth grade this year my mother's name is Karen my father's name is Skip I name it after me my name is Skippy I have a little brother named Current he is almost four weeks old be glad when he get big enough and I can play with him this is a very big school I go to this is a nice room in it it also has a bathroom in the side and it is a few bathrooms on this floor and some on the other one my cousin go to this school too he is a little boy in the second his name is Gregory and plus I have a little friend in the kindergarten his name is Billy he live around my block.

14. SES II, White Male, IQ 79

I have a friend in my class his name is James how high is the rocket how high is the rocket going I would like how far is the moon from the earth how big is the rocket we do spelling and arithmetic and science in my classroom I have two teachers I go to the library my sister she wanna be a nurse I would like to know how tall how high is the moon how far is Venus from the earth I like to do chemistry and work with germs with a telescope and I work with microscope, toy rockets, and I play ball and I have a friend in my class.

15. SES II, White Male, IQ 131

My mother's name is Edith my father's name is Lou my sister's name is Richard my mother's name is my sister's name is Barbara

and my name is Michael my sister is 13 my brother is 3 4
in school we usually have math in the morning and social studies
spelling language and then it's about lunchtime and sometimes
on Tuesday we have gym in the afternoon and we also have it on
Thursday that's today and we beat the other class all the time
and then in the afternoon we usually work on our puppets and
I put on it's made out of clay.

16. SES II, Negro Female, IQ 122

Yes I'd like to tell you about my little sister Gail her name
is Gail Maria she's only six months old but she's a lot of fun
anyway every day when I come out when I come home from school
she sits in her crib waiting for me first thing she does she
starts calling name at least she tries she tries to say dada
and she hardly can sit up yet yesterday she was trying to crawl
in her bed she almost fell out she fell the day the same day
she almost she was sitting on my bed and she tried to crawl
off to follow me the first time I ever took care of Gail she
fell off the bed.

Scoring the Linguistic Data

For the analysis of expressive language obtained through the
Clown and Rocket techniques, the results of normative studies by de-
velopmental psychologists and the descriptive and structural methods
of linguists were used as procedural guides. The remaining section
of this chapter is devoted to descriptions of the major language
measures used in the present study. Operational criteria developed

while working with a language measure are referred to, with the details of these given in Appendix III. Finally, the statistical results of the application of the language measures are presented.

The Variables Measured

The various language measures applied to the typed protocols were selected from previous studies. The measures included: the sheer number of words spoken by each child during the testing period (TV0, total verbal output); the use of the four major parts of speech, i.e., nouns, verbs, adjectives, adverbs (see Appendix III E); type token ratios (TTRs, the ratio of the number of different words in a speech sample to the total number of words used); the number of sentence units spoken by each child; the mean length of sentence units characteristic of the child's speech pattern; and the use of dependent and independent clauses. The TV0 yielded a measure of verbosity; the TTRs gave a measure of verbal richness; the distribution of parts of speech and the various measures of sentence complexity were indicators of the children's mastery of language structure.

The language data were scored by two trained research assistants. Each rater checked the results of the other. Since the scoring procedures were specific, any differences in scoring were found to be errors rather than differences in subjective judgments.

Table 2 shows the specific language measures for which the Clown and Rocket data were analyzed. Also listed in Table 2 are certain demographic variables and additional test devices which were major aspects of the data analysis. (See Appendix III A for definitions of each variable.)

TABLE 2.--Linguistic Analysis of Clown and Rocket Data:
Language, Demographic, and Other Test Measures

<u>Variable Number</u>		
	<u>Grade</u>	
1	5	Variable Measured
1.	1.	tvo: Total verbal output in first minute.
2.	2.	TVO: Total Verbal Output in five minutes.
3.	3.	TTR (initial): Number of different words in first 100 words.
4.	4.	TTR (final): Number of different words in final 100 words.
5.	5.	Nouns: Number used in five minutes.
6.	6.	Verbs: Number used in five minutes.
7.	7.	Adjectives: Number used in five minutes.
8.	8.	Adverbs: Number used in five minutes.
9.	9.	Sentence Units: Number used in five minutes.
10.	10.	Extraneous Words: Number used within sentence units.
11.	11.	Maze Words: Number used between sentence units.
12.	12.	Mean Sentence Length: Within five minutes.
13.	13.	Wepman Error Score on "Different" Items.
14.	14.	Sex: Male coded as 1; female coded as 2.
--	15.	Reading Score: Fifth graders - Gates Adv. Pri. Para.
15.	16.	IQ Score: Lorge-Thorndike Test.
16.	17.	Race: White coded as 1; Negro coded as 2.
17.	18.	Dependent Clauses: Number used in five minutes.
18.	19.	All Clauses: Total of all clauses used in five minutes.
19.	20.	SES: Socioeconomic status, decimal rating.

Studies of vocabulary include those based on the type-token ratio (TTR), i.e., the ratio of the number of different words used (types) to the total number of words used (tokens). As worked out by Johnson (1944), the TTR is used as a measure of the range of vocabulary or verbal richness. A relatively large ratio indicates a greater range of vocabulary with less redundancy than a relatively small ratio. Chotlos (1944) found that regardless of intelligence, there were considerable individual differences in TTRs among children. However, in general, children who scored higher on intelligence tests used more different words in written samples than did children with lower intelligence test scores. The type-token ratio is not necessarily confined to word units, and Chen and Irwin (1946) have used a ratio based on similar speech sounds to explore the progression of speech development among children learning to talk. Appendix III includes an illustration of the TTR computation for speech samples 100 words in length.

An analysis of syntax constitutes an exploration into the child's grasp of the implicit rules underlying the structure of English. Since the basic unit of expression of a single idea is the sentence, the Clown and Rocket protocols were coded for sentence units, a task that presented the problems characteristic of attempts to punctuate transcribed speech samples. The criteria established as guides for coding sentences appear in Appendix III.

The first measure of syntactic ability was the total number of complete sentences spoken by the child during the five minute testing

period.

The second measure was the mean length of each child's sentences. Total number of words spoken (TVO) was also a measure used in this analysis, but many words did not fall into a sentence structure, e.g., the repetitions, false starts, and language tangles that Loban (1961) conceptualized as "mazes," and these were excluded from the length of sentence word count. The mean sentence length measure is highly sensitive, as a result, and a relatively short protocol can show a high degree of syntactic organization, while a long protocol can show poor syntactic organization.

There is lack of agreement as to the influence of intelligence on sentence length. Hahn (1948) concluded that intelligence did not enter into her study as an important variable affecting sentence length. On the other hand, E.A. Davis (1937a) has reported a slight positive correlation between length of a child's remark and his IQ score.

The third measure of syntactic ability was that of dependent clauses. The dependent and independent clauses were evaluated separately at each grade level. The criteria for scoring clauses appear in Appendix III.

Analyzing the Data

The data obtained from the Clown and Rocket protocols were analyzed to determine the influence of school grade (developmental level), social class status, race, and sex on language performance.

The first and fifth grade data were analyzed separately except where tests of interaction effects between grade level and other measures were desired. Correlation analysis was used to establish the interrelationships among the various linguistic variables, intelligence, reading, auditory discrimination, and demographic characteristics. To reduce the correlation matrices to their basic factorial components, factor analysis was used. This procedure resulted in the isolation of three definable factors for each grade level. Certain major defining variables within the factors were selected for further statistical treatment.

Although various language measures have been found to correlate highly with each other, only vocabulary measures are known to correlate significantly with IQ score (Miller, 1951; Templin, 1957). Therefore, sampling methods designed to form subgroups equated for IQ score were rejected. Instead, analyses of variance and covariance¹ were used on the selected defining variables of the factors. These analyses permitted evaluations of the language data both as separate from and as influenced by measured intelligence.

Results

Intelligence Test Results

The results of the Lorge-Thorndike, Form A, Level 1, administered to the first graders, and Level 3, Nonverbal, administered to the fifth graders, are shown in Tables 3 and 4. Two-tailed t test

¹The harmonic mean was used as an approximation for missing cases, in order to adjust for inequalities in cell size.

TABLE 3.--Means, Standard Deviations, and Significance Tests of Lorge-Thorndike
IQ Scores by SES, Race, and Sex for 62 First Grade Subjects

	<u>SES I</u>			<u>SES II</u>			<u>SES III</u>			<u>Total</u>	
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$ SD
Male	13	91.7	12.7	17	103.6	14.0	10	113.3	13.0	40	102.2 ^b 15.4
Female	9	94.4	9.7	5	105.4	14.7	8	105.6	17.0	22	101.0 14.3
Negro	10	92.1	5.7	12	99.9	12.8	6	105.8	13.8	28	98.4 ^c 11.9
White	12	93.4	14.8	10	108.9	13.9	12	111.9	15.6	34	104.5 16.7
Total	22	92.8 ^a	11.4	22	104.0	13.8	18	109.9	14.9	62	101.73 14.81

Note.--The following two-tailed t test comparisons are based on the subgroup mean scores given above.

^aSES I vs. SES II: $t=2.87$; $p < .01$

SES I vs. SES III: $t=4.06$; $p < .01$

SES II vs. SES III: $t=1.26$; N.S.

^bMale vs. Female: $t=.29$; N.S.

^cNegro vs. White: $t=1.65$; N.S.

TABLE 4.--Means, Standard Deviations, and Significance Tests of Lorge-Thorndike
IQ Scores by SES, Race, and Sex for 105 Fifth Grade Subjects

	SES I			SES II			SES III			Total	
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$ SD
Male	15	92.9	18.4	17	102.0	18.8	17	105.1	13.8	49	100.3 ^b 17.5
Female	27	91.3	13.1	15	101.9	12.5	14	113.6	8.4	56	99.7 14.9
Negro	23	89.6	14.7	18	98.1	13.7	13	101.2	11.6	54	95.2 ^c 14.4
White	19	94.7	15.3	14	107.0	17.6	18	114.5	9.5	51	105.1 16.4
Total	42	91.9 ^a	15.0	32	102.0	15.9	31	108.9	12.3	105	99.74 15.88

Note.--The following two-tailed t test comparisons are based on the subgroup mean scores given above.

^aSES I vs. SES II: $t=2.75$; $p < .01$

SES I vs. SES III: $t=5.10$; $p < .01$

SES II vs. SES III: $t=1.91$; N.S.

^bMale vs. Female: $t=.18$; N.S.

^cNegro vs. White: $t=3.24$; $p < .01$

comparisons were made of the subgroup differences in mean IQ test scores.

As shown in Table 3, at the first grade level SES I subjects obtained a mean IQ score significantly lower than either the SES II subjects or the SES III subjects. The difference in mean IQ score between the SES II group and the SES III group was not significant. In addition, there were no significant differences in mean IQ scores between the Negro and white subjects or between the male and female groups, where both comparisons were computed across the social class subgroups.

Table 4 shows that at the fifth grade level significant differences in mean IQ scores, in the expected direction, were obtained between SES groups I and II and I and III. As at the first grade level, there were no significant differences between the SES II and SES III groups. Also as at the first grade, there were no significant differences between the measured intelligence of male and female subjects. However, a significant difference in mean IQ was obtained for the Negro and white comparison, with the 10 point difference in score favoring the white subjects.

The data clearly establish an association between measured intelligence and SES level and also reflect associations among IQ score, race, and age.¹

¹These findings are in agreement with those of previous studies showing that on standard group and individual intelligence tests, middle class children score higher than do lower class children. For discussion of this phenomenon and that of cumulative deficit, whereby disadvantaged children show increasing IQ decrements with age, see Lorge & Thorndike (1954b), Riessman (1962), Klineberg (1963), and Deutsch & Brown (in press). The reader is cautioned against inferring inherent social class and racial differences from these data. These findings will be discussed in a subsequent section.

Language Results

For the first grade data a 19 x 19 matrix of product-moment coefficients of correlation between the variables was compiled. For the fifth grade data a 20 x 20 matrix was compiled. Tables 5 and 6 show the intercorrelation matrices for the first and fifth grade data, respectively. (See Appendix III for definitions of the language, demographic, and other test measures entered in the matrices.) Each matrix was subjected to a standard centroid factor analysis for the purpose of identifying common dimensions among the many variables. The first 10 centroids, accounting for the largest proportion of the common variance, were rotated to an orthogonal simple-structure solution using the varimax analytic method.

Table 7 shows the group means and standard deviations for each variable, by grade level. Table 8 shows the ratio of each language measure to the total speech output (TVO). Tables 9, 10, and 11 show the loadings on three factors extracted from each matrix.

It can be seen from Table 7 that the fifth grade group was more productive than the first grade group on each language variable of the research. Table 8 shows that despite the grade level differences in mean absolute scores, the proportion of the mean language scores to the total output of speech was, in general, the same for the two groups. The exceptions to this occurred on the type-token ratio, nouns, and sentence length measures.

Although the fifth graders had a higher type-token ratio score than the first graders did, when the number of words compared was held constant for two groups, the first graders used more different words than

TABLE 5.--Intercorrelations Among Language and Other Measures, Grade 1 (N=62)

Variable	No.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
tvo	1	85	18	40	79	82	62	73	73	41	20	43	-12	16	20	01	81	80	26
TVO	2		25	39	93	95	75	87	86	45	30	46	-04	19	14	-04	86	91	27
TTR (initial)	3			65	36	15	27	35	15	-04	-13	23	-36	19	36	-30	23	18	33
TTR (final)	4				48	29	37	38	25	02	01	26	-27	32	21	-17	38	30	30
Nouns	5					86	70	81	80	39	23	44	-04	25	15	-13	77	84	27
Verbs	6						68	80	89	37	32	34	02	15	14	01	83	92	24
Adjectives	7							71	70	34	17	23	11	17	08	03	71	74	10
Adverbs	8								82	38	29	30	00	07	10	-08	82	97	17
Sentence	9									19	19	04	02	14	11	04	72	98	19
Units	10										13	57	15	-02	02	-12	48	28	25
Extraneous	11											-02	00	-13	-12	25	14	18	-07
Words	12												-07	19	02	-21	47	16	21
Maze Words	13																		
Sentence	14																		
Length	15																		
Wepman Error	16																		
Score	17																		
Sex	18																		
IQ	19																		
Race	20																		
Dependent	21																		
Clauses	22																		
All	23																		
Clauses	24																		
SES	25																		

Legend: $r > .25$, $p < .05$; $r > .32$, $p < .01$.

TABLE 6.---Intercorrelations Among Language and Other Measures, Grade 5 (N=105)

Variable	No.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
tvo	1	85																		
TVO	2		-09	-13	79	81	61	59	70	37	28	29	-11	07	08	24	-12	59	77	08
TTR (initial)	3		-12	-21	88	96	67	73	82	46	35	30	-03	07	05	19	-06	74	94	04
TTR (final)	4			46	02	-17	11	-16	-11	-33	-36	04	-16	-04	10	18	02	-01	-07	24
Nouns	5				-06	-24	15	-18	-11	-34	-18	-11	03	-01	14	22	-01	-12	-14	30
Verbs	6					80	67	49	75	33	31	31	-06	03	10	18	-05	56	80	03
Adjectives	7						58	72	83	47	32	21	00	09	03	14	-04	74	95	01
Adverbs	8							40	54	21	23	26	10	07	11	17	-04	54	65	17
Sentence	9								65	39	32	08	09	08	-11	11	09	49	69	-01
Units	10									23	26	-02	01	11	-02	12	04	38	88	-01
Extraneous	11										39	16	-02	-25	-06	-08	-01	37	34	-01
Words	12											03	13	-12	07	-17	07	09	22	-19
Maze Words	13												-11	-09	-05	19	-06	37	17	12
Sentence	14													02	-04	-35	09	05	03	05
Length	15														04	-03	-07	09	11	-11
Wepman Error	16															25	-36	06	01	-07
Score	17																-37	13	15	33
Sex	18																	-13	-03	-10
Reading	19																		77	08
IQ	20																			04
Race																				
Dependent																				
Clauses																				
All Clauses																				
SES																				

Legend: $r > .19$, $p < .05$; $r > .25$, $p < .01$.

TABLE 7.--Means and Standard Deviations of Language
and Other Measures by School Grade

Variable	<u>First Grade</u> (N=62)		<u>Fifth Grade</u> (N=105)	
	Mean	SD	Mean	SD
tvo (1 minute)	69.79	42.48	102.10	41.80
TVO (5 minutes)	322.94	176.81	524.03	197.49
TTR (initial)	50.77	7.85	55.96	8.72
TTR (final)	49.85	8.46	55.55	7.50
Nouns	53.40	34.14	93.33	31.90
Verbs	64.16	33.30	97.90	38.96
Adjectives	20.16	16.19	29.47	15.64
Adverbs	27.84	21.78	37.85	21.42
Sentence Units	42.76	21.08	52.91	19.58
Extraneous Words	4.31	5.06	13.05	11.58
Maze Words	21.40	20.67	31.26	23.17
Sentence Length	6.35	2.04	8.95	3.80
Wepman Error Score	8.39	5.50	4.53	2.74
Dependent Clauses	9.61	7.72	17.84	14.04
All Clauses	52.37	27.18	71.00	28.33
Reading	--	--	38.43	19.44

TABLE 8.--Ratio of Mean Language Variable Scores to
Mean Total Verbal Output Score by School Grade

Mean Language Score:TVO	Grade 1	Grade 5
tvo:TVO	.22	.19
TTR (average):TVO	.15	.10
Nouns:TVO	.13	.18
Verbs:TVO	.20	.19
Adjectives:TVO	.06	.06
Adverbs:TVO	.09	.07
Sentence Units:TVO	.13	.10
Extraneous Words:TVO	.01	.02
Maze Words:TVO	.07	.06
Sentence Length:TVO	.02	.10
Dependent Clauses:TVO	.03	.03
All Clauses:TVO	.16	.14

TABLE 9.--Factor 1, First and Fifth
Grade Data, Rotated Factor Loadings

<u>First Grade</u>		<u>Fifth Grade</u>	
Variable	Loading	Variable	Loading
All Clauses	.96	All Clauses	.97
TVO	.94	TVO	.97
Verbs	.92	Verbs	.95
Sentence Units	.92	Sentence Units	.86
Adverbs	.89	Nouns	.84
Nouns	.86	tvo	.84
Dependent Clauses	.83	Adverbs	.73
tvo	.80	Dependent Clauses	.72
Adjectives	.78	Adjectives	.71

TABLE 10.--Factor 2, First and Fifth
Grade Data, Rotated Factor Loadings

<u>First Grade</u>		<u>Fifth Grade</u>	
Variable	Loading	Variable	Loading
TTR (initial)	.80	TTR (initial)	-.66
TTR (final)	.71	TTR (final)	-.62
Wepman Error Score	.51	Extraneous Words	.52
IQ	.39	Maze Words	.46
Sex	.35	SES	-.33
SES	.35	IQ	-.23

TABLE 11.--Factor 3, First and Fifth
Grade Data, Rotated Factor Loadings

<u>First Grade</u>		<u>Fifth Grade</u>	
Variable	Loading	Variable	Loading
Sentence Length	-.61	Race	-.55
Extraneous Words	-.56	IQ Score	.55
SES	-.43	Reading Score	.40
tvo	-.34	Wepman Error Score	-.37
IQ Score	-.33	Sentence Length	.35
Dependent Clauses	-.33	tvo	.27
Race	.31		
TVO	-.27		

the fifth graders when the score was proportionate to the total speech output. In other words, although the fifth graders talked more than the younger children, their speech vocabulary was not proportionately more varied. However, the fifth graders used proportionately more nouns than the first graders did, and the older group used longer sentences than the younger children did.

The ratios also reveal that first graders did not maintain their initial flow of words whereas fifth graders increased their flow of words after a relatively slower start.

Intercorrelations of the Variables

Factor 1, the dominant factor, which accounted for 67% and 69% of

the common variance for grades one and five, respectively, showed appreciable loadings on nine variables. Table 9 indicates that the variables load at an extremely high level and were within a very restricted range. Except for some variations in the order of the loadings for each grade, the factor components were identical at both grade levels. The range of the variable loadings subsumed under Factor 1 was somewhat narrower at grade one than at grade five.

Factor 1

Evaluation of the components of the factor, at both grade levels, led to naming it the Verbal Output Factor. Background characteristics such as IQ, social class, sex, and race showed very minimal loadings on the Verbal Output Factor. The factor was defined by the measures of total number of clauses, words, sentences, and parts of speech. The inclusion in the factor structure of the parts of speech measures was easily comprehended, since approximately half of the total word count consisted of their numerical sum. The various measures of clauses and of number of sentences represented additional aspects of productivity.

The highly restricted range of factor loadings and the high positive intercorrelations of the component variables of Factor 1 reflected the association of productivity with other aspects of speech. Since productivity on any one language measure was highly dependent on total speech productivity, these high positive correlations would be expected. The variable intercorrelations revealed that the measures of adverbs and adjectives, dependent clauses, and number of sentence

units, were least highly associated with the other variables. Of the four major parts of speech, quantitative productivity was more closely associated with nouns and verbs than with adverbs and adjectives.

Factor 1, Verbal Output, appeared, at first, to represent only quantitative aspects of children's speech, but further qualification was indicated. Since it is possible to use many words merely to form short simple sentences, the fact that "all clauses" (the sum of dependent and independent clauses) was the variable which loaded most heavily in the factor, superceding the TVO and part of speech measures, indicated that Factor 1 involved more than a sheer word count. The presence in the factor structure of the sentence complexity measure, dependent clauses, further indicated that the factor encompassed a qualitative aspect of speech. High inter-correlations, especially at the first grade level, of all clauses, TVO, and dependent clauses clearly reflected an interdependence between speech rich in clauses and in the number of words used. Factor 1 was therefore viewed as encompassing both productivity and some underlying qualitative aspects of speech.

The mean sentence length measure includes both quantitative (number of words used) and qualitative (the use of clauses to form lengthy sentences) aspects of speech, yet it did not appear in the structure of Factor 1, Verbal Output. However, mean sentence length had a positive and significant relationship with dependent clauses (1st grade, $r=.47$; 5th grade, $r=.37$; $p < .01$) and with TVO (1st grade,

$r=.46$; $p < .01$; 5th grade, $r=.30$; $p < .01$); both dependent clauses and TVO figured prominently in Factor 1. The failure of mean sentence length to appear within the factor structure may be understood by considering the scoring method used. Because the scoring was done on recorded speech, it was difficult to determine when such connecting words as "and" or "so" were intended by the subject to indicate grammatically correct compound sentences and when they represented "fillers" between two sentences. These instances were scored as two separate sentences. This increased the total number of sentences and, in turn, decreased the number of possibilities for scoring long sentences each time they occurred.¹ The result of this scoring procedure was to curtail the quantitative aspect of the variable "sentence length," emphasizing its qualitative aspect. The association between the sentence length measure and other measures of language quality as well as demographic variables in Factor 3, first grade data, to be discussed subsequently, supports this interpretation of the effect of the scoring method chosen.

Table 7 presents the means of the variables included in Factor 1 for each grade level. Here it can be seen, as stated previously, that the older children were consistently more productive than the younger group. Three-way analyses of variance and covariance on

¹A replication of this work would require application of the same scoring procedure. However, it would be preferable to use a scoring procedure which did not penalize subjects who form grammatically correct compound sentences.

TVO, the variable selected to represent the Verbal Output Factor, by SES, race, and grade revealed that the differences in productivity by grade level were significant beyond the .01 level and were maintained regardless of IQ score. As shown in Table 12, the analyses of variance and covariance did not reveal significant SES or race differences.

TABLE 12.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ) on Total Verbal Output (TVO)

Source	<u>Analysis of Variance</u>			<u>Analysis of Covariance</u>		
	d.f.	Mean Square	F	d.f.	Mean Square	F
SES	2	41,306	1.11	2	3.490	<1
Race	1	3,428	<1	1	3,917	<1
Grade	1	1,341,251	35.94**	1	1,403,306	38.68**
SESxRace	2	49,074	1.32	2	46,491	1.29
SESxGrade	2	26,939	<1	2	23,604	<1
RacexGrade	1	6,571	<1	1	1,508	<1
SESxRacexGrade	2	48,730	1.31	2	44,352	1.22
Within	155	37,315		154	36,044	

** $p < .01$

Table 13 includes the mean TVO scores and standard deviations of each experimental subgroup.

TABLE 13.--Mean Total Verbal Output (TVO)
by SES, Race, and School Grade

Subgroups		N	$\bar{X}$	SD
Grade 1, White				
SES	I	11	281.09	163.29
	II	10	396.60	196.63
	III	12	318.42	197.47
Grade 1, Negro				
SES	I	11	275.09	173.23
	II	12	287.42	104.12
	III	6	444.67	145.57
Grade 5, White				
SES	I	15	504.80	259.71
	II	13	549.62	158.48
	III	19	551.68	178.96
Grade 5, Negro				
SES	I	23	531.70	221.77
	II	18	498.50	149.62
	III	17	507.18	182.76

Summary. Factor 1, Verbal Output, represented quantitative and qualitative aspects of children's speech. Speech productivity, as measured by the language variables in this research, increased significantly with age. Inspection of the factor components revealed associations among sentence complexity, productivity of words and sentences, and the parts of speech measures. The absence of demographic variables from the structure of Factor 1 can be interpreted as supporting an expectation that background characteristics are more likely to influence variables related to aspects of speech quality alone.

Factor 2

The factor loadings and the intercorrelations among the defining variables obtained for Factor 2, named the Variety of Output Factor, for the first and fifth grades, are presented in Table 10. The means for each defining variable of Factor 2, by grade level are given in Table 7.

Variety of Output was a minor factor, accounting for only 19% and 17% of the common variance, for grades one and five, respectively. The two variables which loaded most heavily on this factor, initial and final Type Token Ratios, were identical for grades one and five, though the loadings were higher at the first grade level. The remaining variables comprising Factor 2, Wepman Error Score, IQ, Sex, and SES at the first grade, and extraneous words and maze words at grade five, were language measures which represent qualitative rather than

quantitative aspects of verbal behavior.

SES, the last variable included in Factor 2, was present in equal strength at both grade levels. At the first grade level various background characteristics including SES predicted variety of speech. By the fifth grade, the SES level became the overriding background characteristic which influenced TTR. This occurred despite the fact that IQ score was significantly associated with SES level at both grade levels.

Factor 2 represented a qualitative aspect of speech as typified by the Type Token Ratio. As shown in Table 10, the directions of the factor loadings were identical at both grade levels and revealed that the lower SES groups yielded the most redundant speech. Conversely, the most varied speech vocabulary was obtained at the higher SES levels.

On background characteristics and TTR scores, the two grades were very similar. On Wepman Score, extraneous words, and maze words, the groups differed. At the first grade level, each TTR measure was also associated with the Wepman Error Score for the "different" items. It appears that for the younger children greater sensitivity to auditory stimuli, indicated by few errors on the Wepman task, was related to more varied speech, represented by higher initial and final TTR scores. At the fifth grade level, the Wepman Error Score was no longer a defining variable of the Variety of Output Factor. Among the fifth graders the Wepman Score appeared subsequently in Factor 3 and in association with IQ score as the two appeared in Factor 2 at the first grade level.

Further comparisons of the Variety of Output factor structures for each grade revealed that Wepman Error Score, IQ Score, and Sex were associated with TTR at the first grade, while at the fifth grade, extraneous and maze words replaced these variables to form a cluster with TTR. By the fifth grade, where verbal productivity has increased markedly, variety of speech was associated with the measures of the different words used (TTRs) as well as with those measures representing repetitions and lapses in precision of word choice (maze and extraneous words). Since the TTRs measured the number of different words used, and extraneous and maze words are often repetitions of words, it was logical to find the grouping of these variables in the factor structure.

The relationship between the TTR (final) score and SES level was significant and positive (1st grade, $r=.33$, $p < .01$; 5th grade, $r=.30$, $p < .05$). In general, the higher TTR scores were obtained by the higher SES groups. The TTR (final) measure was selected to represent the Variety of Output Factor for three-way analyses of variance and covariance by SES, race, and grade. Analysis of variance showed a significant main effect for SES level. However, this effect disappeared when the effect of intelligence was controlled by the covariance analysis (see Table 14). This finding can be understood by considering that while higher TTR scores tended to be significantly associated with the higher IQ

test scores,¹ there were highly significant differences between the mean IQ test scores of most of the SES groups of the research sample.

TABLE 14.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ) on Type Token Ratio (Final TTR)

Source	<u>Analysis of Variance</u>			<u>Analysis of Covariance</u>		
	d.f.	Mean Square	F	d.f.	Mean Square	F
SES	2	3	4.56*	2	115	1.80
Race	1	1	1.50	1	25	<1
Grade	1	9	14.86**	1	1,063	16.61**
SESxRace	2	1	2.17	2	165	2.58
SESxGrade	2	<1	<1	2	36	<1
RacexGrade	1	1	2.87	1	246	3.84
SESxRacexGrade	2	<1	<1	2	38	<1
Within	155	.66		154	64	

* $p < .05$

** $p < .01$

Table 15 presents the mean TTR scores and standard deviations of each subgroup.

¹Grade 1: TTR (initial) and IQ, $r = .36$, $p < .01$; Grade 5: TTR (final) and IQ, $r = .22$, $p < .05$.

TABLE 15.--Mean Type Token Ratio (Final TTR)
by SES, Race, and School Grade

Subgroups	N	$\bar{X}$	SD
Grade 1, White			
SES I	11	.50	.08
II	10	.55	.05
III	12	.54	.05
Grade 1, Negro			
SES I	11	.46	.06
II	12	.47	.08
III	6	.54	.10
Grade 5, White			
SES I	15	.55	.08
II	13	.57	.06
III	19	.55	.09
Grade 5, Negro			
SES I	23	.52	.10
II	18	.58	.08
III	17	.60	.07

Summary. Among first grade children the most varied speech tended to be produced by girls and was associated with higher scores on an intelligence test, greater sensitivity to auditory stimuli, and with higher socioeconomic levels. Fifth grade children employed a

significantly wider range of oral vocabulary than did first graders. At the fifth grade level the most diversified vocabulary was associated with higher intelligence, with higher SES status and, logically enough, with a smooth flow of speech.

Analysis of variance showed a strong SES effect on TTR score, but this effect disappeared when intelligence was controlled by covariance analysis.

Factor 3

While the third factor evident at both grade levels accounted for a minor portion of the common variance--14% and 13% at grades 1 and 5, respectively--curious differences in linguistic behavior between the two grade samples were indicated by the factor structures. The first two factors were, in general, structurally similar for each grade, although the absolute scores of each of the variables within the factors were significantly different for each grade level. In these two factors, Verbal Output and Variety of Output, differences were of degree rather than of type.

At both grade levels Factor 2, Variety of Output, revealed that certain verbal behavior was significantly mediated by the effects of SES and certain SES correlates, wherein children coming from higher SES backgrounds employed more varied speech vocabulary than did children coming from lower SES, or culturally impoverished, environments. The effects of SES and related characteristics on linguistic behavior became more clearly apparent in the third factor extracted for each of the two grades. For the

following discussion, it is important to be aware that the third factor defined only a minor domain in children's linguistic behavior and that the factor structure was different at each grade level.

Factor 3--First Grade Sentence Length. The defining variables of Factor 3 of the first grade data, named the Sentence Length Factor, are given in Table 11.

The correlation between sentence length (mean number of words per sentence unit) and number of extraneous words spoken by subjects at the first grade level was high and positive ($r = .57$, $p < .01$), indicating a strong association between the length of sentences spoken by first graders and repetitious errors, or slips, in speech. Among the younger children, extraneous words appear to have served as bridges between words, to represent faltering in the process of formulating longer sentences.

At the first grade level, sentence length was also clearly associated with verbal output and with the number of dependent clauses found in children's speech. SES and IQ score loaded only moderately on this factor among first graders, and they related to the linguistic variables which appeared in the factor at a uniformly low level.

The factor structure further indicated that among first grade children both length of sentences spoken and verbal productivity (two; TVO) were associated with SES and race. At the first grade level, Negro children and children coming from lower SES backgrounds spoke in shorter sentences and had a truncated level

of total verbal output compared to white children and to children from higher SES backgrounds. However, the interaction between SES and race was not powerful enough to reach the .05 level of statistical significance (see Appendix IV, Table 1). Table 16 shows the mean sentence length scores by subgroups according to SES level and race.

TABLE 16.--Grade 1 Mean Sentence Length
by SES and Race

Subgroups		N	$\bar{X}$	SD
White				
SES	I	11	7.33	2.02
	II	10	6.43	1.78
	III	12	6.47	2.21
Negro				
SES	I	11	5.12	1.60
	II	12	5.84	2.03
	III	6	7.43	1.17

Summary. Factor 3--First Grade Sentence Length indicated that the third definable domain in verbal behavior at this grade level was one of verbal quality as represented by mean sentence length, with SES, intelligence, and race contributing moderately to the structure of the factor. Analyses of variance and covariance did not reveal significant effects by SES or race.

Factor 3--Fifth Grade Intellectual Efficiency. The third factor extracted from the fifth grade data, and labeled the Intellectual Efficiency Factor, was primarily defined by race and intelligence, with reading, Wepman Error Score, mean sentence length, and verbal output (first minute) loading moderately on the factor. Table 11 shows the loadings of the components of the factor.

Inspection of the factor structure indicates that race, IQ score, and reading level variables were superimposed over the linguistic measures. The association of these variables and the weaker loading of mean sentence length at grade 5 compared to grade 1 point to distinct differences between the linguistic behavior of the two age groups.

Summary. Variable intercorrelations and the structure of Factor 3--Fifth Grade Intellectual Efficiency indicated associations among race (white), higher IQ scores, higher reading achievement scores, longer sentence units, fewer errors in auditory discrimination, and the higher total verbal output scores. In contrast to the findings for the first grade data, at the fifth grade level the third definable area related to verbal behavior was primarily one of intellectual efficiency or achievement.

Scoring the Speech Content Data

Data from the Clown and Rocket techniques were analyzed for content to determine if first and fifth graders from different social class levels characteristically talk about different experiences. At the same time, the data permitted an evaluation of certain effects of

age, grade, race, and sex differences on speech content.

Of special interest was whether middle class children would reflect the academic orientation of their group by having spoken more about school than did lower class children. To test this, it was important to know not merely how much verbiage was devoted to school as an area of social experience but also the character of the child's verbalization about school. What aspects of school did he talk about? Studies? Play activities? The teacher's personality? Subcategories established for each major content heading made it possible to evaluate differences and to generate additional lines of inquiry. For example, are middle class children particularly involved in school experience, and is this reflected in their preoccupation with scholastic performance and achievement? Or, perhaps, do lower class children have a tendency to focus on the non-academic aspects of school life in a verbal situation such as described here?

Working empirically with the Clown and Rocket protocols, a list of topics and the criteria for content categories were established. To provide a more detailed content analysis, subcategories were delineated within each general topic. Coding of the content was done by sentence units. Each sentence unit was assigned to one of the content categories. No sentence unit was scored more than once. A tally was kept of the number of times each category was referred to by the subjects.

The content categories represented those experiences spoken

about most frequently by the children in the test situation. In evaluating the protocols, efforts were made to characterize the children's references to various aspects of their social experience. It was noted, for example, that in speaking about school or family life, the children dealt with the following areas: descriptions of the physical environment; descriptions of activities; descriptions of people according to their physical appearance, activities, behavior, social roles, and relationship to the subject; and descriptions of interaction between other people and the subject, including the child's feelings and opinions about others. The major topics included, among others, references to "School," "Family," "Friends," "Leisure Time Activities," and "Fantasy." Typical subtopics were "School Studies," "School Activities," "Family Members--Identification" (e.g., "My sister's name is Barbara."), "Family Members--Interaction" (e.g., "I went shopping with my mother.").

The content categories, together with explanatory statements and examples of each taken from the test protocols, appear in Appendix V.

The content of the Clown and Rocket protocols was analyzed by chi square (X^2) comparing observed frequencies with those expected by chance. The assumption was made that if only chance were operative, frequencies within a category would not be greater for one subgroup than for another. Since categories were established for almost every topic referred to by the children, the data

analysis capitalized on chance. To compensate for this, it is necessary to interpret significant findings cautiously. Actual cell frequencies represented the number of subjects talking about a topic or subtopic compared to the number of subjects who did not offer the response. The data were analyzed for each major topic and/or the various subtopics wherever the observed and expected frequencies met X^2 requirements. A technique for three-way X^2 analysis which partitions the X^2 in a manner analagous to the partitioning of the variance in analysis of variance was utilized for examination of the topical and subtopical categories.¹ The method yielded the effects due to the main classifying variables as well as the effects due to various combinations (interactions) of the variables. The topical and/or subtopical categories were systematically analyzed as follows whenever cell frequencies permitted:²

Grade x SES x Content Category

Grade x Race x Content Category

Grade x Sex x Content Category

¹See Winer (1962, pp. 629-632) for a description of chi square analysis for a mixed model when sampling is restricted with regard to variables A and B but random with respect to C. Appendix VI shows a worksheet used to compute a three-way chi square analysis for a mixed model.

²Five categories omitted from the analysis because the cell frequencies were too low to meet chi square requirements were: A₁-Physical Description of School, A₅-Teacher Description, B₁-Physical Description of Home, F₂-Other Fantasy, H-Geographical Description. Three "miscellaneous" ²categories were not evaluated.

Significant grade effects were obtained for 90% of the analyses. Consequently, the grades were treated separately in pursuing further analyses involving SES x Race x Content Category. In actual practice, most of these analyses were focused on the fifth grade, wherein theoretical cell frequencies were large enough to permit X^2 analysis.

Results

The present study was particularly concerned with the influence of social class status on the various aspects of language. However, the results pertaining to grade effects are presented first for clarity of organization.

Tables 17-23 present the significant X^2 results. Appendix VII indicates those X^2 computations which yielded nonsignificant results. Cell frequencies represent the number of subjects who responded in the content category (yes) compared to those who did not (no).

Table 17 shows the significant X^2 values of the grade level comparisons of speech content. It can be seen that a considerable number of significant differences was obtained. Since, as shown in the preceding section, fifth graders talked considerably more than first graders did, it might have been expected that they

would consistently talk more about each topic. However, it was possible that the older children, instead of covering a wider range of topics, might have talked at greater length about a few. In fact, significant differences between the first and fifth graders were not obtained for all topics (see Appendix Table 4).

Table 17 reveals that several significant differences were found for subtopics within the major heading of "School." Proportionately more fifth grade subjects, compared to first graders, responded in the "Studies," "Teacher Identification," and "Teacher Interaction" subtopics. The two groups did not differ when compared on the basis of the "School," or any other general topic heading.

The results for the categories "Family" and "Friends" were very similar to those above. There were no differences between groups by main topic heading, while the subtopics dealing with identification, description, and interaction did discriminate between the grade levels, as did the subtopic "Home Routine." Throughout, the differences were in the direction of proportionately more fifth graders responding in the category than first graders.

Three of the four subtopics under "Leisure Time" yielded significant results, with proportionately more older than younger children responding. Future plans ("Fantasy") and objective self-description ("Self-Identification") were additional content categories employed by the older group to a significant extent.

TABLE 17.--Frequencies and χ^2 s for Grade
Differences in Content Responses

Content		Grade 1 (N=62)	Grade 5 (N=105)	χ^2
A ₃ -Studies	(yes) (no)	20 42	50 55	3.94*
A ₄ -Teacher Identification	(yes) (no)	1 61	15 90	7.23**
A ₆ -Teacher Interaction	(yes) (no)	4 58	38 67	18.31**
B ₃ -Family Identification	(yes) (no)	7 55	26 79	4.46*
B ₅ -Family Interaction	(yes) (no)	16 46	43 62	3.85*
C ₁ -Friends Identification	(yes) (no)	5 57	34 71	12.88**
C ₂ -Friends Description	(yes) (no)	3 59	23 82	8.65**
C ₃ -Friends: General Interaction	(yes) (no)	15 47	63 42	20.08**
C ₄ -Friends: Group Interaction	(yes) (no)	2 60	24 81	11.44**
D ₁ -Independent Activities	(yes) (no)	11 51	36 69	5.28*
D ₂ -Reading	(yes) (no)	2 60	13 92	4.00*
D ₃ -Hobbies	(yes) (no)	3 59	18 87	5.37*
F ₁ -Fantasy: Future	(yes) (no)	16 46	46 59	5.41*
G ₂ -Interaction with Examiner	(yes) (no)	44 18	57 48	4.53*
I-Self-Identification	(yes) (no)	7 55	27 78	5.00*

The single instance in which proportionately more first than fifth graders responded was "Interaction with Examiner." The older children placed more emphasis on their involvements with teachers and friends than on their involvement with family. The fifth graders were significantly differentiated ($p < .05$) from the first graders in their interest in the future and in their emphasis on activities pursued independently.

The data for the significant relationships between SES level and content given are shown in Table 18. The single significant result within the "School" topic shows that proportionately more fifth grade SES II subjects emphasized "School Activities." The "Family Identification" category was stressed by the SES III group for the combined first and fifth grades. "References to Family Members" was stressed by the SES III subjects within the first grade only.

TABLE 18.--Frequencies and X^2 s for SES Differences in Content Responses (Grade 1, N=62; Grade 5, N=105)

Content	Grade		SES Level			X^2
			I	II	III	
B ₃ -Family Identification	1 & 5	(yes)	10	7	16	6.72*
		(no)	50	46	38	
B _{3,4,5,6} -References to Family Members	1	(yes)	9	5	12	7.82*
		(no)	13	17	6	
A ₂ -School Activities	5	(yes)	15	20	13	5.35*
		(no)	23	11	23	

* $p < .05$

The data for the significant effects of race for the content analysis are shown in Table 19. Proportionately more white than Negro subjects, first and fifth grades combined, responded with content about school studies. Inspection of the actual protocols revealed that the references to studies were positive in tone. Responses about the immediate test situation came from proportionately more Negro than white subjects for the combined school grades.

TABLE 19.--Frequencies and X^2 s for Racial Differences in Content Responses (Grades 1 & 5, N=167)

Content	Grade		White	Negro	X^2
A ₃ -Studies	1 & 5	(yes)	41	29	5.50*
		(no)	39	58	
G ₁ -Immediate Situation	1 & 5	(yes)	9	23	6.20*
		(no)	71	64	

*p < .05

The effect of sex on content proved significant in two categories as shown in Table 20. With the first and fifth grades combined, girls talked more than boys about "Teacher Interaction" and "Friends Description."

Table 21 presents the data yielding significant X^2 s for grade by SES interactions. For both the "School Activities" and "Home Routine" subtopics, the largest proportion of subjects responding came from the fifth grade SES II and the first grade SES III groups. For the

topic "Independent Activities" the trend was the same for the first graders (SES III) but changed for the fifth graders to the SES I group. The general trend for the three content categories, then, was for proportionately more younger children of the highest SES level to respond and for proportionately more older children of the lower SES groups to respond.

TABLE 20.--Frequencies and X^2 s for Sex Differences in Content Responses (Grades 1 & 5, N=167)

Content	Grade		Male	Female	X^2
A ₆ -Teacher Interaction	1 & 5	(yes)	17	25	4.45*
		(no)	74	51	
C ₂ -Friends Description	1 & 5	(yes)	9	17	4.91*
		(no)	82	59	

*p < .05

TABLE 21.--Percentages and X^2 s for Grade by SES Interactions in Content Responses (N=167)

Content		First Grade			Fifth Grade			X^2
		SES: I (N=22)	II (N=22)	III (N=18)	I (N=38)	II (N=31)	III (N=36)	
A ₂ -School Activities	(% yes)	18%	27%	50%	45%	58%	36%	8.29*
	(% no)	82%	73%	50%	55%	42%	64%	
	(Total %)	100%	100%	100%	100%	100%	100%	
B ₂ -Home Routine	(% yes)	14%	9%	22%	16%	35%	8%	7.02*
	(% no)	86%	91%	78%	84%	65%	92%	
	(Total %)	100%	100%	100%	100%	100%	100%	
D ₁ -Independent Activities	(% yes)	14%	9%	33%	73%	42%	19%	8.32*
	(% no)	86%	91%	67%	27%	58%	81%	
	(Total %)	100%	100%	100%	100%	100%	100%	

*p < .05

The data for the significant X^2 s for grade by race interactions are shown in Table 22. Whereas in the first grade a greater proportion of white children spoke about the "Home Routines" and "Entertainment" categories, among the fifth graders a greater proportion of Negro children spoke about these areas.

TABLE 22.--Percentages and X^2 s for Grade by Race Interactions in Content Responses (N=167)

Content		First Grade		Fifth Grade		X^2
		Negro (N=29)	White (N=33)	Negro (N=58)	White (N=47)	
B ₂ -Home Routine	(% yes)	10%	18%	27%	9%	4.79*
	(% no)	90%	82%	73%	91%	
	(Total %)	100%	100%	100%	100%	
D ₄ -Entertainment	(% yes)	3%	27%	36%	15%	11.03**
	(% no)	97%	73%	64%	85%	
	(Total %)	100%	100%	100%	100%	

*p < .05; **p < .01

As seen in Table 23, a greater proportion of fifth grade boys than girls emphasized the category of "Friends: Group Interaction," whereas a greater proportion of first grade girls than boys talked about this subtopic.

TABLE 23.--Percentages and χ^2 s for Grade by Sex
Interactions in Content Responses (N=167)

			<u>First Grade</u>		<u>Fifth Grade</u>		χ^2
			Male	Female	Male	Female	
<u>Content</u>			(N=40)	(N=22)	(N=41)	(N=54)	
C ₄ -Friends: Group	(% yes)		0%	9%	29%	17%	4.00*
	Interaction . (% no)		<u>100%</u>	<u>91%</u>	<u>71%</u>	<u>83%</u>	
	(Total %)		100%	100%	100%	100%	

*p < .05

Summary

Comparisons of the speech content of first and fifth grade subjects, further divided into subgroups according to socioeconomic level, race, and sex, revealed that the most striking and consistent differences were obtained in relation to grade level. These include, among others, greater proportions of fifth than first graders talking about such topics as identification and interaction with teachers and with peers, participation in hobbies, activities pursued alone, and discussion of the future. Proportionately more first than fifth graders entered into direct conversation with the examiner.

The influence on speech content of SES level, race, and sex, including the interaction of these with grade level, yielded fewer, but still a substantial number of, significant differences. Examples of these results include proportionately more subjects emphasizing

topics as follows: SES III, both grade levels, "Family Identification;" SES III, first grade, "References to Family Members;" SES II, fifth grade, "School Activities;" SES III--first grade, SES I--fifth grade, "Independent Activities;" white subjects, both grade levels, "School Studies;" Negro subjects, both grade levels, "Immediate Test Situation;" white subjects--first grade, Negro subjects--fifth grade, "Home Routines" and "Entertainment;" girls, both grade levels, "Teacher Interaction" and "Friends Description;" boys--fifth grade, girls--first grade, "School Activities" and "Home Routines." The implications of the findings are discussed in the final chapter of this report.

Summary of Expressive Language Results

Continuous speech samples were obtained in a relatively unstructured setting from first and fifth grade, Negro and white, boys and girls of three social class levels. While fifth grade children were found to be more productive on every language measure than first graders were, in general the proportion of any language score to the total output of speech was the same at both grade levels. Intercorrelations among the language, demographic, and other test measures (IQ, reading, and sound discrimination scores) tended to be higher at the first grade than at the fifth grade level.

Factor analysis, based on the intercorrelations of the language, demographic, and other test measures, yielded three discrete factors at each grade level. The first two factors,

Total Verbal Output and Variety of Output, were identical at both grade levels. The third factors obtained were First Grade Sentence Length and Fifth Grade Intellectual Efficiency. Analyses of variance and covariance (controlling for IQ) were computed on selected defining variables of the factors. Speech productivity and sentence length were found to be unrelated to any demographic variable. While social class level, but not race, was found to be significantly related to variety of speech, this relationship was not maintained when variations in IQ score were controlled. Since the third factor for the fifth grade data did not include any language measures, analyses of variance and covariance were not applied. However, the components of the Fifth Grade Intellectual Efficiency Factor revealed that the race variable was related to IQ, reading, and sound discrimination test scores. The first grade data, similarly, showed no relationship between the race variable and the language measures of the research.

The analysis of speech content showed that although the fifth graders talked more than did the first graders, they tended to cover a wider range of content rather than to discuss any one topic more intensively than did the younger group. Speech content was not found to be related in any consistent way to grade, sex, race, or social class level.

The foregoing results are discussed in Chapter VI, Conclusions and Implications.

V. Receptive Language Study

The two main objectives of this aspect of the study were the evaluation of (a) the extent to which information is successfully communicated from teachers to pupils of various social backgrounds and (b) the degree of effective communication among children from different social backgrounds.

The Subjects

The research sample consisted of 64 first grade children and 127 fifth graders. As in the first study, Expressive Language, subgroups were defined by social class level, race (Negro and white), and sex. The fifth grade subjects were further divided into two groups to permit varying the mode of presentation of the experimental technique.¹ All subjects, pupils in the New York City public schools, were tested on the school premises. Table 24 shows the number of individuals in each of the subgroups.

Socioeconomic Level

The method for assigning social class ratings to subjects is described in Appendix I. For this experiment, children coming from the intermediate social class level (SES II) were excluded; only SES I and SES III children were used. Except for some underrepresentation of middle class Negro males who received the visual presentation of the test material, cell frequencies were approximately equal.

¹The experimental technique referred to is the Cloze technique, described in detail in the following section on procedure.

TABLE 24.--Receptive Speech: Distribution of Subjects by School Grade, SES, Race, and Mode of Presentation

Group	<u>SES I</u>		<u>SES III</u>	
	Negro	White	Negro	White
<u>First Grade (N=64)</u>				
Male	8	8	8	8
Female	8	8	8	8
<u>Fifth Grade, Auditory Presentation (N=62)</u>				
Male	7	8	10	6
Female	8	8	8	7
<u>Fifth Grade, Visual Presentation (N=65)</u>				
Male	10	8	3	8
Female	14	8	6	8

Intelligence

The Lorge-Thorndike Tests (1954), Levels 1 and 3, Nonverbal, Form A, were administered to all the subjects of the study. Means and standard deviations of Lorge-Thorndike IQ scores for the various cells are reported in Tables 25, 26, and 27.

Analysis of variance of the IQ test data indicated, for the first grade sample, that SES I children obtained a significantly lower mean IQ than did SES III children ($F_{1,56}=30.68$, $p<.01$), and Negro children earned a significantly lower mean IQ than white children did ($F_{1,56}=6.44$, $p<.05$). For the fifth grade samples analysis of variance also

TABLE 25.--Means and Standard Deviations of Lorge-Thorndike
IQ Scores by SES, Race, and Sex for First Grade Subjects,
Cloze Auditory Presentation, (N=64; N per subgroup=8)

Group	<u>Negro</u>		<u>White</u>		<u>Total</u>	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
<u>SES I</u>						
Male	89.3	11.2	99.3	17.8	94.3	14.5
Female	86.4	7.0	95.1	11.0	90.8	9.0
Total	87.9	9.1	97.2	14.8	92.5	12.8
<u>SES III</u>						
Male	108.6	10.4	113.4	12.5	110.0	11.5
Female	103.6	14.4	110.4	7.4	107.0	10.9
Total	106.1	12.4	111.9	10.0	109.0	11.2
<u>Totals</u>						
Male	98.4	14.5	106.3	10.6	102.6	14.2
Female	95.0	14.1	102.8	12.0	98.9	14.4
Total	97.0	14.2	104.5	14.4	100.8	14.3

TABLE 26.--Means and Standard Deviations of Lorge-Thorndike
IQ Scores by SES, Race, and Sex for Fifth Grade Subjects,
Cloze Auditory Presentation (N=62)

Group	N	<u>Negro</u>		N	<u>White</u>		N	<u>Total</u>	
		$\bar{X}$	SD		$\bar{X}$	SD		$\bar{X}$	SD
<u>SES I</u>									
Male	7	97.7	7.5	8	87.8	15.4	15	92.4	11.7
Female	8	94.8	8.6	8	85.9	12.3	16	90.4	10.5
Total	15	96.1	7.9	16	86.8	13.5	31	91.3	11.9
<u>SES III</u>									
Male	10	98.9	12.6	6	125.0	14.6	16	108.7	13.4
Female	8	108.9	8.0	7	113.3	22.8	15	111.1	14.9
Total	18	103.3	11.9	13	118.7	19.6	31	109.8	15.1
<u>Totals</u>									
Male	17	98.4	10.5	14	103.7	24.0	31	100.8	17.8
Female	16	101.8	11.1	15	98.7	23.3	31	100.3	17.2
Total	33	100.1	10.8	29	101.1	22.9	62	100.3	17.5

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TABLE 27.--Means and Standard Deviations of Lorge-Thorndike
IQ Scores by SES, Race, and Sex for Fifth Grade Subjects,
Cloze Visual Presentation (N=65)

Group	N	<u>Negro</u>		N	<u>White</u>		N	<u>Total</u>	
		$\bar{X}$	SD		$\bar{X}$	SD		$\bar{X}$	SD
<u>SES I</u>									
Male	10	101.9	12.6	8	101.6	15.0	18	101.8	13.7
Female	14	91.7	9.4	8	96.3	10.6	22	93.4	9.8
Total	24	96.0	11.6	16	98.9	12.9	40	97.2	12.1
<u>SES III</u>									
Male	3	103.7	3.5	8	120.3	14.0	11	115.8	11.1
Female	6	110.8	7.1	8	114.3	10.5	14	112.8	9.0
Total	9	103.4	17.7	16	117.3	12.3	25	114.1	11.8
<u>Totals</u>									
Male	13	102.3	11.8	16	110.9	17.0	29	107.1	12.7
Female	20	97.5	12.4	16	105.3	13.8	36	100.9	9.5
Total	33	99.4	12.2	22	108.1	15.5	65	103.7	12.0

indicated a significant difference by social class in the same direction as reported above ($F_{1,111}=59.77$, $p < .01$). There were no significant racial differences in the fifth grade sample. There were no significant sex differences at either grade level. These findings are related to the receptive language findings results in the following chapter (VI. Conclusions and Implications).

Although the two samples of fifth grade subjects were matched on the basis of SES, race, and sex, the mean IQ test score of those subjects receiving the visual mode of presentation was significantly higher than the mean IQ of those receiving the auditory presentation ($F_{1,111}=5.41$, $p < .05$; see Appendix VIII, Analysis of Variance Tables 10 and 11). These mean IQ differences between the experimental groups appeared to be a chance outcome of the random sampling procedures used, rather than the result of any bias in assigning subjects to groups.

Procedures

The Cloze procedure, a simple word deletion technique, was developed by Taylor (1953) to study the comprehensibility of written communication. The more stereotyped the message in terms of its lexical, grammatical, and syntactical structure, the better subjects are able to replace omitted items. This technique provided a flexible means of using the ability to predict words deleted from speech samples as a measure of children's understanding of teachers' language and the language of fifth grade children from various social backgrounds.

Restriction of the presentation of the Cloze material to the usual written method makes the task dependent on reading skill. An auditory form more closely approximates verbal communication, since the

listener must rely on his auditory perception and his recall of the prior speech sequence. The Cloze material used in this research was selected to represent speech of different social groups. Variations in intonation and inflection were, of course, more easily captured in an auditory than in a visual presentation.

First Grade Cloze

The first graders, who in any case would not be expected to have reading skills, received only an auditory presentation. Usually a Cloze passage is constructed by deleting every nth word. The mutilated passage is then presented to the subject, who supplies the deleted word. On the basis of pretesting, it became evident that a Cloze passage presented this way would be much too difficult for first graders. A simpler modification was therefore prepared.

Verbatim samples of first grade teachers' continuous speech were taped in classrooms during typical lessons. From these samples three paragraphs, each containing six sentences, were selected. Instead of deleting every fifth word of the continuous speech samples, the final word in each sentence was omitted. Sentences were read to each first grade child by the examiner, who instructed the child to say the missing word whenever the examiner signaled by clapping her hands. (See Appendix IX for the Administration Manual and test items of the First Grade Cloze.)

Fifth Grade Cloze

Paragraphs representing the speech of fifth grade teachers also were prepared for the fifth grade children. Two paragraphs of

approximately fifty words each were selected from taped fifth grade teachers' speech and prepared by deleting every fifth word. The paragraphs were then rerecorded by Institute personnel with the appropriate words deleted for auditory administration and presented to 62 of the fifth grade children. The subjects first listened to the taped presentation of the entire selection including the periods of silence which indicated that something had been deleted. Immediately after this presentation the tape was replayed, and each child was required to write the word he thought had been deleted (See Appendix IX for the Administration Manual and test items of the fifth grade Cloze, auditory presentation.)

The same paragraphs also were prepared for visual presentation, i.e., in written form (see Appendix IX), and presented to the remaining 65 fifth graders. These subjects read each selection in which the deleted words were indicated by lines and then reread the selection, filling in each deleted word seriatim. This form provided more cues than the auditory form because, while he was writing, the subject was able to see what preceded and followed the deletion; on the other hand, the subjects receiving the auditory presentation could depend only on recall.

Speech samples of fifth grade children of varying social background were obtained from the Rocket protocols, described in the previous chapter. Four paragraphs of approximately fifty words each, two representing the speech of children of SES I and two representing the speech of

children of SES III, were selected. In order to balance the effects of race and sex as well as those of social class, each paragraph represented a different SES level-race-sex combination: a middle class Negro girl; a middle class white boy; a lower class white girl; and a lower class Negro boy. Criteria for selection of paragraphs were clarity of original tapes and continuity of thought sequences.

The paragraphs of children's speech were then prepared in the same way as had been the teachers' speech for the fifth grade samples. Children having the same demographic characteristics as the children on the original tapes rerecorded the paragraphs with the appropriate words deleted for the auditory presentation. In addition, a visual form of the children's paragraphs was prepared. The two forms of the children's speech were then administered together with the paragraphs of teachers' speech. For the auditory task, children were tested in groups of approximately six subjects; for the visual task, groups consisted of approximately 13 subjects. Two examiners were present at each test session.

Scoring the Cloze Data

Three scores were developed for both the first and fifth grade Clozes: two are measures of a child's ability to predict a word which maintains the meaning of the paragraph; the third measures a child's ability to predict the correct grammatical form required by the gap. Specifically, the criteria for the three scores are:

1. Absolute score: The insertion is identical with the deletion, or the same word with altered or incorrect grammatical structure, e.g., "childs" for "children."

2. Contextual score: The insertion is either the original deletion or one which maintains the meaning of the original paragraph, e.g., "doctor" for "nurse."

3. Grammatical score: The insertion requires the exact grammatical construction even if the meaning differs from that of the original word, e.g., "alone" for "outside."

It can be seen from the definitions that each test response was evaluated for each of the three scores. Appendix IX includes the complete lists of answers accepted as correct for the first and fifth grade Cloze tasks respectively.

For the first grade presentation and the fifth grade visual presentation all three scores were used and analyzed. For the fifth grade auditory presentation, only one measure, the Absolute score, was used in the analyses. The children who received the auditory presentation recorded their responses on answer sheets. Since it was extremely difficult to determine which answer referred to which deletion, it was therefore almost impossible to score an answer for its contextual or grammatical correctness.

Reliabilities for the three measures by grade and mode of presentation are reported in Table 28. Table 29 reports the reliabilities for the various types of fifth grade children's

speech according to mode of presentation. The Absolute score consistently proved to be less reliable than either of the other two measures. The fifth grade speech samples were more reliable than the first grade measures. This was due to the fact that the first grade task was quite easy; consequently, test scores showed very little variability.

TABLE 28.--Corrected Split Half Reliabilities (r) of Cloze Scores for Teachers' and Children's Speech by School Grade and Mode of Presentation

Score	<u>Teachers' Speech Samples</u>		<u>Children's Speech Samples</u>		
	<u>Grade 1</u> <u>(N=64)</u>	<u>Grade 5</u> <u>(N=127)</u>	<u>Grade 5</u>		
		<u>Auditory</u> <u>(N=62)</u>	<u>Visual</u> <u>(N=65)</u>	<u>Auditory</u> <u>(N=62)</u>	<u>Visual</u> <u>(N=65)</u>
Absolute	.52	.66	.55	.69	.59
Contextual	.55	--	.75	--	.72
Grammatical	.60	--	.80	--	.84

Note.--The fifth grade auditory presentation was not scored for Contextual and Grammatical measures (see previous discussion).

Results

Relationship between Cloze Data and IQ Test Scores

All the Cloze measures were found to be significantly correlated with IQ (see Table 30). Since the SES III groups obtained higher

TABLE 29.--Corrected Split Half Reliabilities (r) of
Fifth Grade Cloze Scores, Children's Speech Samples

Score	SES I Speech	SES III Speech	Negro. Speech	White Speech	Boys' Speech	Girls' Speech
<u>Auditory Presentation (N=65)</u>						
Absolute	.33	.41	.58	.46	.62	.50
<u>Visual Presentation (N=62)</u>						
Absolute	.28	.68	.47	.47	.37	.45
Contextual	.66	.65	.62	.77	.63	.70
Grammatical	.75	.72	.78	.79	.63	.64

mean IQ test scores than the SES I samples, an analysis of variance and an analysis of covariance was computed for each of the Cloze measures.¹ These data were analyzed separately for the first and the fifth grades and for the teachers' and the children's speech samples.

¹These analyses were made possible through the assistance of Bernard Carol, Department of Preventive Medicine, New York Medical College and Jay Siegel, N.Y.U. Data Processing Center, with a computer program for analysis of covariance design with disproportionate Ns. Since the iterations for higher order interactions were still in the experimental state, only the main effects and first order interactions obtained with this program are reported. Higher order interactions were examined by a method of contrasts which gives a final F without preliminary sums of squares.

**TABLE 30.--Pearson Correlation Coefficients (r), Lorge-Thorndike
IQ Scores and Cloze Scores by School Grade, Speech
Sample and Mode of Presentation**

Score	First Grade <u>(N=64)</u>		Fifth Grade <u>(N=127)</u>		
	Teachers' Speech	Auditory Mode <u>(N=62)</u>		Visual Mode <u>(N=65)</u>	
		Teachers' Speech	Children's Speech	Teachers' Speech	Children's Speech
Absolute	.23	.53	.39	.44	.38
Contextual	.41	--	--	.46	.32
Grammatical	.23	--	--	.45	.37

Note.--The fifth grade auditory presentation was not scored for the Contextual and Grammatical measures.

Note.--For N=60: $r=.21$, $p=.05$; $r=.30$, $p=.01$.

Teachers' Speech

First and fifth grade subjects were tested with samples of teachers' speech.

First Grade Cloze

Appendix Tables 12-14 in Appendix X summarize the analyses of variance and covariance results. (See Appendix XI, Appendix Table 21, for subgroup means and standard deviations by SES level, race, and sex.) The only statistically significant finding for the first grade Cloze data was a social class difference with SES III earning a higher

mean Cloze score than SES I on the Contextual measure ($F_{1,56}=6.69$, $p < .05$; see Table 31). None of the Negro-white or sex differences was statistically significant.

TABLE 31.--Means and Standard Deviations for Significant
SES Difference, First Grade Cloze, Teachers'
Speech, Contextual Score

Group	N	$\bar{X}$	SD
SES I	32	14.91	1.85
SES III	32	16.00	1.50

The Cloze task was extremely easy at the first grade level resulting in minimal test score variability. Social class level differences in IQ test score were marked. In view of the correlation between intelligence and the first grade Cloze Contextual score ($r=.41$), it was not unexpected that the social class difference on the Cloze Contextual score was not maintained when variations in IQ score were controlled by means of analysis of covariance.

Fifth Grade Cloze

Appendix Tables 15-17, Appendix X, summarize the results of analyses of variance and covariance computed on the three sets of scores obtained using the fifth grade teachers' speech samples. (See Appendix XI, Appendix Table 22, for subgroup means and standard deviations by SES level, race, and sex.)

Effect of varying the mode of presentation. It was noted previously that the fifth grade children who received the auditory presentation of the Cloze had a significantly lower mean IQ score than did the children who received the task in visual form. Nevertheless, the auditory presentation was so much more difficult than the visual presentation that controlling for the difference in mean IQ scores between the two samples by means of analysis of covariance did not change the effect obtained with analysis of variance for both the teachers' speech and the children's speech samples ($F_{1,110}=61.89$, $p < .01$; $F_{1,443}=386.86$, $p < .01$; see Appendix Tables 15 and 18).

Mode of presentation evidenced no significant interaction with any other variable, e.g., social class, indicating that no subgroup was penalized more by one method of presentation than by the other.

SES differences. The analysis of variance results showed significant social class differences in the expected direction on all three Cloze measures, with lower class subjects doing less well than the middle class group (Absolute score: $F_{1,110}=10.56$, $p < .01$; Contextual score: $F_{1,57}=9.55$, $p < .01$; Grammatical score: $F_{1,57}=6.13$, $p < .05$). The means and standard deviations for these differences are reported in Table 32. As with the first grade teachers' speech data, these effects were not upheld when the data were examined by analysis of covariance which controlled for IQ.

TABLE 32.--Means and Standard Deviations for Significant
SES Differences, Fifth Grade Cloze,
Teachers' Speech

Group	N	$\bar{X}$	SD
<u>Absolute Score</u>			
SES I	71	6.89	3.09
SES III	56	7.98	3.10
<u>Contextual Score</u>			
SES I	40	13.18	3.22
SES III	25	15.72	2.41
<u>Grammatical Score</u>			
SES I	40	14.45	3.26
SES III	25	16.72	2.75

Negro-white differences. When Negro-white differences were examined, only one significant finding was obtained. Negro children were poorer at replacing the identical word (Absolute score) deleted from paragraphs of teachers' speech than were white children ($F_{1,111} = 5.09$, $p < .05$). The means and standard deviations for this difference are reported in Table 33. Examination of Table 34, which reports means and standard deviations for the significant Race by SES Interaction ($F_{1,111} = 8.71$, $p < .05$), indicates that the obtained Negro-white difference was the consequence of the SES III Negro children's low mean Absolute score. Negro SES I children obtained a higher

mean Absolute score than white SES I children. Negro-white Absolute score differences were eliminated by controlling for IQ by covariance.

No Negro-white differences were found in the ability to replace words that maintained the meaning of the passage (Contextual score) or that met the syntactical requirements (Grammatical score) of the gap produced by the deletion.

TABLE 33.--Means and Standard Deviations for Significant Negro-White Difference, Fifth Grade Cloze, Teachers' Speech, Absolute Score

Group	N	$\bar{X}$	SD
Negro	66	6.82	3.07
White	61	7.97	3.36

TABLE 34.--Means and Standard Deviations for Significant SES by Race Interaction, Fifth Grade Cloze, Teachers' Speech, Absolute Score

<u>SES Level</u>						
Group	N	<u>I</u>	SD	N	<u>III</u>	SD
		$\bar{X}$			$\bar{X}$	
Negro	39	7.15	2.86	27	6.33	2.72
White	32	6.56	3.36	29	9.52	2.64

Sex Differences. Girls obtained a higher Cloze mean Grammatical score than did boys. This effect was sharpened from the .05 ($F_{1,57}=4.39$) to the .01 ($F_{1,56}=7.17$) level of significance by the analysis of covariance. Boys had a higher mean IQ (nonverbal) than girls did, and girls performed better than boys on the Cloze tasks. It is this difference in performance on the IQ and Cloze tests which also resulted in the significant sex difference obtained with analysis of covariance (controlling for IQ) for the Absolute score. Table 35 reports the means and standard deviations for the significant sex differences.

TABLE 35.--Means and Standard Deviations for Significant Sex Differences, Fifth Grade Cloze, Teachers' Speech, Absolute and Grammatical Scores

Group	<u>Measures</u>					
	<u>Absolute</u>			<u>Grammatical</u>		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD
Male	60	6.95	3.30	29	14.55	3.89
Female	67	7.75	2.94	36	15.94	2.51

Again, it was the difference in Cloze and IQ test performance that produced the significant Class by Sex effect for the Grammatical score with analysis of covariance ($F_{1,56}=5.64$, $p < .05$). SES I girls earned a higher mean Grammatical score than did SES I

boys; at the SES III level there was no difference between boys and girls (Table 36).

TABLE 36.--Means and Standard Deviations for Significant SES by Sex Interaction, Fifth Grade Cloze, Teachers' Speech, Grammatical Score

Group	N	SES I		N	SES III	
		$\bar{X}$	SD		$\bar{X}$	SD
Male	18	13.11	3.58	11	16.91	3.27
Female	22	15.54	2.56	14	16.57	2.38

Children's Speech

Only fifth grade subjects were tested with the samples of children's speech. Appendix X, Tables 18-20, summarizes the results of analysis of variance and analysis of covariance of the obtained scores. (See Appendix XI, Tables 23-25 for subgroup means and standard deviations by SES level, race, and sex.)

Influence of type of speech sample

Girls' speech yielded higher mean scores than boys' speech did on all three Cloze measures (Paragraph Sex¹ effect, Absolute score: $F_{1,443}=23.83$, $p < .01$; Contextual score: $F_{1,227}=10.58$, $p < .01$; Grammatical score: $F_{1,227}=4.08$, $p < .05$). For the Absolute and Grammatical scores the Negro samples elicited higher mean performances than did the white samples (Paragraph Race

¹In the presentation of results which follows, the terms "Paragraph Sex," "Paragraph Social Class," and "Paragraph Race," refer to analyses based on the sex, social class, and race of the children whose speech was used to form Cloze paragraphs, e.g., "Paragraph Sex" results refer to the analysis of the subjects' responses to the paragraphs of boys' and girls' speech.

effect: $F_{1,443}=7.31, p < .01$; $F_{1,227}=31.62, p < .01$). For the visual presentation, lower class and Negro selections were easier than middle class and white paragraphs; with the auditory presentation, subjects obtained higher mean scores on middle class and white passages (see Tables 37 and 38, Absolute score, Paragraph Social Class by Condition¹ interaction: $F_{1,443}=4.86, p < .05$; Paragraph Race by Condition interaction: $F_{1,227}=10.22, p < .01$).

TABLE 37.--Means and Standard Deviations for Significant Condition by Paragraph Social Class, Fifth Grade Cloze Children's Speech, Absolute Score

Presentation	N	SES I Speech		SES III Speech	
		$\bar{X}$	SD	$\bar{X}$	SD
Auditory	62	7.11	2.32	7.84	3.10
Visual	65	12.77	2.02	12.65	4.76

TABLE 38.--Means and Standard Deviations for Significant Condition by Paragraph Race, Fifth Grade Cloze, Children's Speech, Absolute Score

Presentation	N	Negro Speech		White Speech	
		$\bar{X}$	SD	$\bar{X}$	SD
Auditory	62	7.26	2.39	7.84	3.10
Visual	65	13.46	2.46	11.95	2.50

¹"Condition" refers to mode of presentation, i.e., auditory or visual.

SES Differences

SES I children earned significantly lower mean scores than SES III children on all three Cloze measures of the children's speech samples (Absolute score: $F_{1,444}=44.17$, $p < .01$; Contextual score: $F_{1,228}=14.02$, $p < .01$; Grammatical score: $F_{1,228}=22.32$, $p < .01$). Even when intelligence was controlled by analysis of covariance, SES differences were maintained for both the Absolute and Grammatical scores ($F_{1,443}=7.15$, $p < .01$; $F_{1,227}=7.24$, $p < .01$). Table 39 reports the means and standard deviations for the significant SES differences.

TABLE 39.--Means and Standard Deviations for Significant
SES Differences, Fifth Grade Cloze,
Children's Speech Samples

Group	N	$\bar{X}$	SD
<u>Absolute Score</u>			
SES I	71	19.17	6.91
SES III	56	21.43	6.33
<u>Contextual Score</u>			
SES I	40	33.75	4.16
SES III	25	36.56	3.12
<u>Grammatical Score</u>			
SES I	40	33.98	3.85
SES III	25	37.16	2.67

Table 40 shows that SES I and SES III children performed at approximately the same level of efficiency on the lower class speech items. However, SES III children were superior to SES I children on the middle class speech items (Absolute score, SES by Paragraph Social Class interaction: $F_{1,443}=12.56, p<.01$). That is, SES I children performed equally well on both lower and middle class speech samples.

TABLE 40.--Means and Standard Deviations for Significant SES by Paragraph Social Class Interaction, Fifth Grade Cloze, Children's Speech, Absolute Score

Group	N	SES I Speech		SES III Speech	
		$\bar{X}$	SD	$\bar{X}$	SD
SES I	71	9.77	3.57	9.39	3.86
SES III	56	9.98	3.86	11.45	3.29

Table 41 indicates that for the Grammatical score there was no difference in the mean performance of SES III children on the Negro and white selections. However, the SES I children had a lower mean score on the white speech samples than they did on the Negro speech samples¹ (significant SES by Paragraph Race interaction:

¹The rocket protocols described in the previous chapter, the source of the speech samples, yielded no significant Negro-white differences for the linguistic variables evaluated.

$F_{1,227}=6.62$, $p < .05$), a difference which was maintained when intelligence was controlled by covariance.

TABLE 41.--Means and Standard Deviations for Significant SES
By Paragraph Race Interaction, Fifth Grade Cloze,
Children's Speech, Grammatical Score

Group	N	Negro Speech		White Speech	
		$\bar{X}$	SD	$\bar{X}$	SD
SES I	40	18.12	1.74	15.90	2.59
SES III	25	18.96	1.72	18.20	1.35

Negro-White Differences

Although no overall Negro-white difference was obtained with the children's paragraphs on any one of the three Cloze measures, Table 42 indicates that there was no difference between Negro and white mean Grammatical scores for the Negro passages, but for the white selections white children obtained a higher mean Grammatical score than the Negro children did (Race by Paragraph Race interaction: $F_{1,227}=6.62$, $p < .05$).

TABLE 42.--Means and Standard Deviations for Significant Race by
Paragraph Race Interaction, Fifth Grade Cloze,
Children's Speech, Grammatical Score

Group	N	Negro Speech		White Speech	
		$\bar{X}$	SD	$\bar{X}$	SD
Negro	33	18.36	1.50	16.00	1.98
White	32	18.47	2.11	17.59	2.66

Table 43 shows that SES III Negro children obtained lower mean Absolute scores than SES III white children did. In contrast, Negro SES I children obtained a higher mean Absolute score than either Negro SES III children or white SES I children on Negro speech. On the other hand, white SES III children were superior in Absolute score performance on white speech to white SES I children and Negro SES III children (SES by Race by Paragraph Race interaction: $F_{1,444}=4.03, p < .05$).

TABLE 43.--Means and Standard Deviations for Significant SES by Race by Paragraph Race Interaction, Fifth Grade Cloze, Children's Speech, Absolute Score

Group	<u>Negro Speech</u>						<u>White Speech</u>					
	<u>Negro</u>			<u>White</u>			<u>Negro</u>			<u>White</u>		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
SES I	39	10.72	3.60	32	9.31	4.04	39	9.41	3.42	32	9.22	3.67
SES III	27	10.26	3.52	29	11.93	3.92	27	9.44	4.05	29	11.14	3.02

Table 44 shows that on the Absolute score, although the girls' speech samples¹ were easier than the boys' samples were (see Appendix Table 26),

¹The middle class Negro girl's paragraph was indistinguishable either by content or speech inflection from a middle class white girl's speech, so that, in effect, the girls' paragraphs represented the same white speech.

Negro children were slightly superior to white children on the boys' speech but obtained a lower mean score on the girls' speech samples (Race by Paragraph Sex interaction: $F_{1,443}=4.88$, $p < .05$).

TABLE 44.--Means and Standard Deviations for Significant Race by Paragraph Sex Interaction, Fifth Grade Cloze, Children's Speech, Absolute Score

Group	N	<u>Girls' Speech</u>		<u>Boys' Speech</u>	
		$\bar{X}$	SD	$\bar{X}$	SD
Negro	66	10.61	3.81	9.27	3.44
White	61	11.48	3.96	9.00	3.70

Sex Differences

On the combined samples of children's speech, fifth grade girls earned a higher Absolute score than did the boys ($F_{1,444}=15.01$, $p < .01$). Since the girls did better on Cloze tasks and the boys had higher mean IQ test scores, the sex effect for the Absolute score was maintained ($F_{1,443}=20.71$, $p < .01$), and a sex effect for the Contextual score, in favor of the girls' group, was revealed by the covariance analysis ($F_{1,227}=17.19$, $p < .01$). Table 45 reports the means and standard deviations for the significant sex differences on the children's speech samples.

Significant social class by sex interactions were obtained by analysis of variance for the Absolute and Contextual scores

TABLE 45.--Means and Standard Deviations for Significant Sex Differences, Fifth Grade Cloze, Absolute and Contextual Scores

Group	N	<u>Scores</u>				
		<u>Absolute</u>		<u>Contextual</u>		
		$\bar{X}$	SD	N	$\bar{X}$	SD
Male	60	18.80	7.08	29	33.93	4.65
Female	67	21.39	6.62	36	35.56	3.31

($F_{1,444}=16.53$, $p < .01$; $F_{1,228}=5.40$, $p < .05$). These effects were maintained and, in addition, the same effect was shown to exist for the Grammatical score when the data were examined by analysis of covariance ($F_{1,443}=21.79$, $p < .01$; $F_{1,227}=8.54$, $p < .01$; $F_{1,227}=4.40$, $p < .01$). Table 46, which reports the means and standard deviations for the Class by Sex effect, indicates that the sex differences were the result of differential performance by SES I males and females (boys obtaining lower mean Cloze scores); SES III boys and girls showed no difference in Cloze performance.

Table 47 illustrates the significant SES by Race by Sex interaction obtained for the Grammatical score ($F_{1,228}=6.19$, $p < .05$). SES I white males achieved a lower mean Absolute score than SES I white females, whereas SES III white males obtained a higher mean Absolute score than SES III white females. No difference in performance was obtained between Negro males and females.

TABLE 46.--Means and Standard Deviations for Significant
SES by Sex Interaction, Fifth Grade Cloze,
Children's Speech Samples

Group	N	<u>Male</u>		N	<u>Female</u>	
		$\bar{X}$	SD		$\bar{X}$	SD
<u>Absolute Score</u>						
SES I	33	16.82	6.88	38	21.18	6.33
SES III	27	21.18	4.70	29	21.66	7.09
<u>Contextual Score</u>						
SES I	18	32.00	4.76	22	35.18	3.00
SES III	11	37.09	2.07	14	36.14	3.78
<u>Grammatical Score</u>						
SES I	18	33.28	4.52	22	34.50	3.25
SES III	11	37.73	1.79	14	36.71	3.20

TABLE 47.--Means and Standard Deviations for Significant
SES by Race by Sex Interaction, Fifth Grade Cloze,
Children's Speech, Absolute Score

	<u>Negro</u>						<u>White</u>					
	<u>Male</u>			<u>Female</u>			<u>Male</u>			<u>Female</u>		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
I	17	17.41	6.96	22	22.00	5.60	16	16.19	6.96	16	20.06	7.26
III	13	19.38	6.60	14	19.93	7.31	14	22.86	6.50	15	23.27	6.71

Summary of Receptive Language Results

Teachers' Speech Samples

With respect to the samples of teachers' speech, analysis of the data revealed an increase in SES differences from first to fifth grade. The SES III sample was superior to the SES I sample on the Cloze Contextual score only, at the first grade level, but the SES III group was superior to the SES I group on all three scores of the Cloze at the fifth grade level. These differences were not upheld when IQ variations were controlled through analysis of covariance.

There were no significant Negro-white differences at the first grade level. Fifth grade Negro children were less accurate than white children in replacing the identical word (Absolute score) deleted from samples of teachers' speech. But no Negro-white differences appeared in the ability to replace words that maintained the meaning of the passage (Contextual score) or that met the syntactical requirements (Grammatical score) of the gap produced by deletion. The poorer performance of Negro children on the Absolute measure was the consequence of the Negro SES III subgroup's low mean score as compared with that of the white SES III group. Negro SES I children obtained a higher mean Absolute score than white SES I children. Again, Negro-white differences were not upheld when IQ was controlled through analysis of covariance.

Generally speaking, the fifth grade girls obtained higher mean scores than the boys did on the Cloze tasks. Since the boys had

obtained higher mean IQ scores (Lorge-Thorndike Nonverbal IQ Test), analysis of covariance sharpened and revealed the fifth grade female superiority on the Absolute and Grammatical scores of the teachers' speech items. The fifth grade sex difference on the Grammatical score was identified as a function of social class. SES I girls were superior to SES I boys on this measure of the Cloze task, but no difference was apparent between SES III boys and girls.

Children's Speech Samples

The children's speech paragraphs were administered only to the fifth grade sample. Comparison of the auditory and visual modes of presentation revealed that the auditory form was considerably more difficult. However, the absence of significant interactions between mode of presentation and any other classifying variable, e.g., SES level, indicated that no subgroup was penalized by the more difficult auditory Cloze.

Significant SES differences were obtained for all three Cloze measures of the children's speech paragraphs. In contrast to the results on the fifth grade teachers' speech paragraphs, the SES differences obtained for the Absolute and Grammatical scores of the children's speech paragraphs were maintained even when IQ was controlled through analysis of covariance. No Negro-white differences were obtained with respect to samples of children's speech.

SES I children did as well as SES III children did in replacing the identical deletion from samples of lower class children's speech.

However, SES III children obtained a higher mean Absolute score than did SES I children on the middle class children's speech items. Further, the mean Grammatical score of the SES I children was approximately equal to that of SES III children on the Negro passages, but the SES I mean Grammatical score was considerably lower than the SES III mean Grammatical score on the white selections. In other words, unrelated to the difficulty level of the items, SES I subjects did as well as SES III subjects on lower class and Negro children's speech passages. However, SES I subjects did more poorly than SES III subjects on white children's passages and SES III subjects were considerably superior to SES I subjects on middle class children's speech.

The Negro and white subgroups obtained approximately equal mean Grammatical scores on the Negro children's speech samples, but white subjects obtained a higher mean Grammatical score than Negro subjects did on the white children's selections. In addition, despite the lower difficulty level of the girls' speech, Negro subjects were superior to white on boys' speech items, whereas the performance of the Negro subjects was inferior to that of white subjects on girls' speech items. The quality of the Negro middle class girl's recorded speech was not different from that of the middle class white girl's recorded speech, and only the lower class Negro boy's speech could be classified as regional (Southern) speech. This finding suggests greater efficiency in performance when responding to familiar speech sub-patterns.

These findings, plus the finding mentioned in the foregoing section on Teachers' Speech Samples (Negro SES I subjects' superior mean Absolute score, compared to Negro SES III subjects' mean Absolute score), indicate that the discrepancy between Negro and white performance is least, or nonexistent, under two conditions: when the selection is Negro speech; when the subjects are of the Negro lower class subgroup.

Again, as with the teachers' speech items, the superiority of fifth grade girls compared to fifth grade boys was shown most clearly through the analysis of covariance. Girls earned higher mean Absolute and Contextual scores than the boys did. Significant SES by Sex interactions for all three Cloze measures revealed that, in all cases, SES I girls were superior to SES I boys, but SES III boys and girls were approximately equal in performance.

VI. Conclusions and Implications

In the following sections the expressive and receptive language variables with respect to their association with measured intelligence, social class status, developmental level, race, and sex are discussed. The relationship of the results to previous studies, an evaluation of the test devices, and the implications of the findings for educational practice and further research are then presented.

Measured Intelligence and the Language Measures

With regard to the relationship between measured intelligence and language, the Expressive Language Study confirms and extends the findings of previous work by H.M. Williams (1937) and Templin (1957). The first grade data of the present study revealed the positive relationship of range of vocabulary (final TTR measure) and sound discrimination ability (Wepman Error Score) to intelligence reported by both Williams and Templin. As in these earlier studies, the first grade data revealed no other significant intercorrelations of language measures with IQ scores. At the fifth grade level, however, in addition to the continued association of vocabulary range and sound discrimination ability with intelligence test performance, the absolute number of words spoken (TV0) and mean sentence length were found to be significantly associated with IQ score. It appears that among older children greater fluency can be expected from children with higher IQ scores. That the fluency consisted of meaningful combinations of words was indicated

by its positive association with the mean sentence length measure in which repetitions have been subtracted from the word count.

The children with higher measured intelligence, at both grade levels, were more adept at dealing with the receptive language task, the Cloze, than were the children with lower IQ scores. While it is possible that the visual Cloze task was essentially a reading comprehension test, the higher IQ subjects were also more successful on the auditory Cloze items.

Intercorrelations of Expressive Language Skills

The use of the intercorrelation technique on language data obtained from the same subjects has been rare. Studies using the procedure include those by Williams (1937), Schneiderman (1955), and Templin (1959). Of these, Templin's was the most comprehensive and the most similar to the present study. Factor analysis was used with data of this nature for the first time in the current study.

Williams' (1937) data on preschoolers' spontaneous conversation included scores on correctness and completeness of word usage, mean length of expression unit, sentence completeness, and complexity of organization. He reported moderate correlations among all these measures except vocabulary, which proved to have a high degree of independence. The present findings were quite consistent with those of Williams, including the appearance of the vocabulary measure, the type-token ratio, as the major defining variable of the Variety of Output Factor (Factor 2).

Templin found that of 189 correlations obtained across age level, 76% were significant at the .01 level, and only 12% did not reach the .05 level of confidence. The data of the present study differed from Templin's in showing fewer significant intercorrelations between language variables. At grade 1 it was found that 39% of the correlations were significant at the .01 level, and 45% did not reach the .05 level of confidence; at grade 5 the number of correlations significant at the .01 level was 35%, and 59% did not reach the .05 level of confidence. Although Templin did not present the separate computations by age level, inspection of the correlation matrices of her study reveals that in Templin's data, too, changes in the magnitude and direction of the various intercorrelations often occurred with increased age. The direction of the changes apparently depends upon the particular language measure evaluated.

Templin's results showing a higher percentage of significant correlations between language measures than was obtained in this study seems related to several differences between the two studies. These include differences in scoring procedures used, in the test situation in which the language samples were obtained, and differences in the specific procedures used for testing language skills. The similarities between the present data and Templin's findings are discussed in subsequent sections.

In comparing the language behavior of children of different age levels, Templin found that the correlations among vocabulary

and length and complexity of response decreased with age during the early school years. This same pattern was obtained when the first and fifth graders of this research sample were compared. Templin speculated that ". . . at the older ages . . . the samples of language obtained in spontaneous utterances in a child-adult setting are not long enough for the complexities of sentence structure and the larger vocabulary of use to become apparent" (1957, p. 127). However, the issue is probably more related to the quality, rather than to the quantity, of speech older children offer in adult-child test situations. Even though the fifth graders produced significantly longer sentences than the first graders did, the proportion of complex sentences to the total speech output was the same at both grade levels.

In the current study it was found that among first graders repetitions of words within sentences were significantly related to sentence length ($r=.57$) and complexity ($r=.48$); among fifth graders the correlation of repetitious words with sentence length ($r=.16$) dropped below the significance level and the correlation with sentence complexity ($r=.37$) also dropped in magnitude. The extraneous repetitions appear to have served as "bridges" between words connected in meaning for the first grade child, as he mentally prepared a relatively complex, lengthy sentence or thought. However, in the case of the older children the repetitions did not appear to improve speech quality in any way.

provides him with the basic model from which to learn, differences in culture can be expected to produce differences in behavior, including language behavior. A major distinction between the language experiences of middle and lower class children is the difference in training which their respective cultures offer them in dealing with abstract ideas.

Bernstein (1961) has described the process whereby the language of lower class children is such that it leads to deficiencies in conceptualizing. One consequence of this is that the more a test device evaluates conceptual abilities, the more likely it is for differences related to antecedent, i.e., background, characteristics to appear. Evidence of this was seen in the results of present research which showed that by the time children reached the fifth grade, intelligence tests, which at this age level rely so heavily on conceptual problems, penalized children in relation to their social class status.

Expressive Language and Developmental Differences

The consistent finding of significant developmental differences occurred as expected. A more provocative approach to the data was the examination of the various ratios of the mean scores of each language measure to the mean Total Verbal Output scores at each grade level. Considering the particular age groups involved, it is not difficult to understand that the younger children were not able to maintain their initial pace of speech over the five minute

testing period and that the fifth graders, at a more self-conscious stage of social behavior, "warmed up" more slowly. It was also possible that the initial flow of speech was more rapid among the younger than among the older children owing to a motivational factor: it may have been that the first graders were more stimulated to keep the clown's nose lighted than the fifth graders were to move the rocket toward the moon. A higher proportion of different words to the total output, and proportionately fewer nouns, would have been expected of the older group, compared to the first graders. The reverse findings in this research are probably explained by the fifth graders' reactions to a relatively unusual conversational task.

Of the many language variables showing significant grade level differences, the sentence length measure appears to be the most useful, showing, as it does, such marked grade level differences in both absolute quantity and proportion to total speech output.

The considerable number of variables which showed no significant grade level differences in proportion to total speech output suggests further evidence for Menyuk's (1963) conclusion that children learn the basic structures of adult language at a very early age. Apparently, this is true not only with regard to familiarity with the various syntactical structures of language, as her data reveal, but also in the extent to which use is made of

complex sentence structure. The most striking evidence of this was the results of this study showing that the fifth graders produced a greater number of complex sentences, as compared with first graders, but they did not produce proportionately more complex sentences than did the first graders.

Expressive Language and Race Differences

At the first grade level, white children produced the most varied vocabulary and yielded the fewest redundancies, or falterings, between sentences. At the fifth grade level, however, there were no significant relationships between any measured language skill and racial group. Young Negro children, then, appear to be most in need of language experiences which will increase both general fluency and range of vocabulary, though it may be that this conclusion overlooks the possibility that the performance of the young Negro child was adversely influenced by the presence of white examiners.

More striking than the few positive findings referred to above, is the relative absence of Negro-white differences on the language measures of this study. This is important evidence that the cognitive repertoire of Negro and white children can be similar as well as different, as it tends to be on IQ and certain other tests. Further, when the number of significant correlations of language measures with SES level are considered, it becomes clear that SES is a more powerful determinant of language behavior than is racial membership.

Expressive Language and Sex Differences

In general, this study bears out the findings of previous recent studies which show relatively few differences between boys and girls on certain language skills. Among the differences obtained in this research were: first grade girls employed a wider range of oral vocabulary and used more nouns than boys did; fifth grade boys faltered and repeated themselves more within sentences than girls did. The appearance of sex differences in language skills is seen to depend on which language measures are evaluated and the conditions under which the language samples are obtained.

Interrelationships of Language, Demographic, and Other Test Measures

The major contribution of the factor analytic approach to the language variables of the research was its specification of three relatively independent clusters of interrelated language variables at each grade level. While previous child language studies have shown that, except for vocabulary range, most language measures are highly associated with each other, there has been no clear indication of the dependence or independence of the different language measures beyond the absolute magnitude of the intercorrelations.

The Verbal Output Factor (Factor 1) shows the strong degree of interrelationships among language measures dependent on the comparative length of the speech sample given by a subject within a specified

period of time.

The Variety of Output Factor (Factor 2) specifically corroborates previous findings showing the relative independence of vocabulary scores from other language measures. Factor 2 confirmed the association of vocabulary with measured intelligence and with SES level, related as the latter is to IQ score. Factor 2 also indicated that among first graders good auditory discrimination ability was positively associated with IQ and SES. Templin's concern that her sound discrimination test not act as an intelligence or vocabulary test led her to formulate a special procedure almost certain to insure that each subject would recognize the stimulus words. Nevertheless, she obtained exceedingly high correlations between the discrimination measure and vocabulary scores in the 3 to 5 year olds, and there were significant correlations between sound discrimination scores and IQ scores in the 6 to 8 year olds. It is not clear from the data of this study, or from Templin's, why such associations exist, though various explanations are possible: It may be that the general mental competence leading to high IQ and vocabulary scores encompasses heightened sound discrimination. Or, it may be that what is operating is a more specific underlying ability to respond to the auditory test directions. Or, perhaps, good sound discrimination skills may promote vocabulary development and other language skills necessary for efficiency on intelligence tests.

The Variety of Output Factor for the fifth grade sample

revealed that at this developmental age the boys had, more or less, reached the girls' level in range of oral vocabulary. Conclusions about vocabulary and sex differences apparently require special attention to the specific age level being considered, as well as to the specific language measure. In the older group, the auditory discrimination task did not emerge in association with the vocabulary-IQ-SES cluster¹, and the use of repetitious words appeared, indicating lack of fluency. The strength of the repetitions within sentences measure (extraneous words) was particularly evident. This may reflect a higher degree of self-consciousness in the fifth grade group, compared to the first graders. If so, the lack of ease may be characteristic of the age level in general, or it may reflect the group's self-consciousness with the particular task.

The components of Factor 3--First Grade Sentence Length raise an interesting point. The mean sentence length measure has long been relied on as a major qualitative measure of language development. At the first grade level the data indicated the appropriateness of this, as the sentence length measure was joined by the fluency, complexity, productivity, SES, IQ, and race variables. At the fifth grade level, however, the third factor was different in that the sentence length variable was superseded

¹Indirectly, this is similar to the higher correlations of sound discrimination scores with the preschoolers' vocabulary scores than the correlations of the discrimination scores with IQ among

by IQ and by other measures strongly associated with IQ score. This was so in spite of the evidence that the fifth graders in this sample appear to have performed in accordance with expectations for their age group (E.A. Davis, 1937a). It seems that Templin was correct to doubt the usefulness of the mean sentence length measure for evaluating the verbalizations of older children tested in an adult-child situation. By the age of nine or ten, the artificiality of such test situations may delimit the quality of the speech productions to a significant extent. This view is supported by data showing that in written compositions this age group produces longer sentences than those obtained from any adult-child test situation (Heider & Heider, 194

At the fifth grade level, the third definable factor in verbal behavior proved to be one primarily of intellectual efficiency or achievement, in contrast to the language quality content of the third factor in the first grade data. It appears that as Negro children get older, the discrepancy between their IQ scores and those of white children increases, while the discrepancy between the two groups' scores on the language measures of this research decreases. At the first grade level the disadvantaged child's experiences seem to have been relatively sufficient to provide him with certain language skills. By the fifth grade, however, he does not seem to have had the background of experiences in the use of the more complex language necessary both for success on intelligence tests and for expressing himself meaningfully in complex sentence structure.

A significant decrement in mean performance level on verbal tests and on tests of general intellectual ability during the school years was hypothesized by Klineberg (1963) and substantiated by Deutsch and Brown (1963). These investigators have attributed the drop in performance among lower social class children to limited environmental stimulation. Deutsch and Brown have demonstrated that the deficit is very pronounced by the time a child reaches the fifth grade. This "cumulative deficit" phenomenon occurs with striking regularity among lower social class Negro youngsters in homes broken by absence of father.

Since it was found that language differences between social classes were not maintained when IQ was controlled, how much leeway remains for the educator to improve children's language skills? Dawe's study, referred to previously, showed that when she trained preschoolers in language, she obtained an increase in IQ score as well. It is now more clearly specified in which areas of language disadvantaged children require special attention and that the training should commence at as early a school age as possible. However, it should be noted that Dawe's study did not employ control groups in which subjects received attention, interest, etc., without the specific language training. It is therefore unclear whether the improvements in language and IQ test scores were due to special training, to the child's positive response to the focus on him, or to some combination of the two.

3

The Content of Expressive Language

The analysis of the content of protocols from the Clown and Rocket situations was striking in the evidence for differences in amount and variety of verbal behavior between grade levels and the relative absence of these differences between social class levels, races, or sexes.

The results did not reveal significant differences in focus on academic activities according to social class membership, although non-academic school activities received some emphasis from subjects of the highest social class level assessed in the study. While there were several instances where the content was influenced by the variables of race and sex, there was no consistent trend or pattern in the findings.

As would be anticipated for older children, fifth graders were more likely than first graders to refer to school, teacher, etc. Also consistent with expected differences by age, the older group indicated more involvement with such topics as friends, career, and activities undertaken independently. While the younger children might have been expected to emphasize family topics, the reverse proved to be the case. However, the older group did indicate greater involvement with friends than with family, a finding consistent with peer interests typical for their age level.

That social situations have greater interest for girls than boys appeared in the data of the first grade group. By the fifth grade level, however, this expected trend was overshadowed by the

boys' marked interest in peer group activities.

The greater frequency of first graders' verbalizations about the examiner, compared to fifth graders, may have been a reflection either of the younger child's tendency toward greater openness of expression, or spontaneity, at least in certain situations, or a reflection of his greater dependence on adults.

The evaluation of interactions among social class level, grade, and race revealed several significant findings. Among these, higher social status and a focus on routines and family relationships were found to be associated. This can be interpreted as an outcome of the emphasis on planning and organization of activities and within the family constellation itself, which tends to be more characteristic of upper than of lower class groups.

More Negro than white children, at both grade levels, discussed the immediate test situation. The Negro subjects may have been able to verbalize their reactions to the test situation more freely than the white subjects were. Or, the reverse might be true: their more frequent references may suggest they were more uncomfortable with the white examiner than the white children were. It is apparent that the possible effect of examiner variable warrants further controlled exploration, although the use of the clown and rocket mechanical devices as the recipients of the child's speech was an effort to minimize the interpersonal factor in the test situation as much as possible.

The basis for an expectation that social class membership would

influence speech content has been established by previous authors. Bernstein's (1962) discussion of the "restricted" language use mainly by the lower working class and the "elaborated" language characteristic of the higher social class covers both structural and topical aspects of British speech. Landreth, too, has pointed out that "Environmental differences are reflected in differences in the form and content of children's speech in different situations and in the level of speech development in children whose environments offer different kinds and amounts of speech stimulation" (1960, p. 152).

The Clown and Rocket task attempted to encourage the production of continuous spontaneous speech samples; however, the general tendency toward similarity of content raises the question of whether the test situation served to obscure differences among groups. It has been found that children use more socialized speech in the presence of adults than with peers (Smith, 1935). Landreth, too, has pointed out that the particular situation in which the speech samples are obtained has a marked influence on the content. Therefore, the children in the school setting and in the presence of an adult may have had the effect of evoking responses the children considered acceptable to the examiners.

Several factors suggest that the Clown and Rocket tasks may have been more suitable for eliciting relatively spontaneous speech from first than from fifth graders. Whereas the younger group is still relatively close to the monologue stage of speech behavior

fifth graders are at a developmental period of lessened spontaneity. The test protocols of some fifth grade subjects contained critical, or otherwise self-conscious, remarks about the task. In contrast, the greater frequency and quality of the younger children's references to the immediate situation and to the examiner suggested greater spontaneity on the part of first compared to fifth graders, even though, unexpectedly, the first graders rarely entered into direct "conversation" with the Clown.

Receptive Language and Social Class Differences

Social class differences in certain receptive language skills are considerably more apparent at fifth grade than first grade. At first grade level, middle class children gave significantly more meaningful responses (Contextual score) to the teachers' speech Cloze items than the lower class subjects did. At the fifth grade, lower class children did less well than their middle class peers on all the Cloze measures of teachers' speech: they less often replaced the exact missing word, less often filled the deletion with a contextually meaningful response and less often were able to substitute for the deleted word a word correct in grammatical form. While these effects were not maintained when intelligence was controlled statistically, nevertheless, the data support the point of view that there is a language barrier between the middle class teacher and the lower class child, particularly the child in the higher elementary school grades. This is consistent with data showing that IQ differences due to social class increase with age

(Deutsch, 1963; Lorge and Thorndike, 1954).

In all cases it was the measures that correlated .40 or above with IQ that showed SES differences. Again the interrelationship between language skills and performance on an intelligence test is demonstrated, even when the test is a so-called nonverbal one as was the case in this study.

However, that there is an influential variable other than measured intelligence was demonstrated by the results with the children's speech samples. Lower class children's ability to fill in the deletion with the exact word omitted was as good as middle class children's performance when both groups were responding to lower class speech samples. The performance of the middle class child was significantly superior to that of the lower class child when the speech passage was a middle class one, and it was this effect which produced the significant social class difference.

Receptive Language and Race Differences

One of the most striking results of the present study was the relative absence of Negro-white differences, particularly in light of the relationship of both the task and race to IQ. There was only one significant result with respect to racial subgroups: Fifth grade Negro children were less able than white children to replace the identical deletion. However, no difference was found between Negro and white children in the ability to replace words that maintained the meaning (context) of the passage or that fulfilled the grammatical requirements of the gap. This study was relatively

unique in that effort was made to balance the sample for both SES and race. The results indicated that social class appears to be a more relevant factor than race in affecting performance on the type of language comprehension task represented by the Cloze technique.

One fact regarding Negro performance became salient from this study. It was the Negro SES III subjects whose performance, relative to their social class, was most inadequate. The Absolute score Negro-white difference for Teachers' Speech was revealed to be due to the SES III subjects' poor performance. This finding could be interpreted in relation to IQ scores, since the difference between SES I white and Negro children's mean IQ scores was minimal, but the difference between SES III white and Negro children's mean IQ scores was 14 points. However, Negro SES III subjects' mean IQ was higher (7 points) than Negro SES I subjects' mean IQ score. Nevertheless, SES I Negro subjects did as well as SES I white subjects and SES III Negro subjects on the Negro children's speech samples, with respect to the Absolute score. It may be that Negro SES III children can be considered to speak two dialects with subsequent diminished efficiency in each dialect.¹ Diminished efficiency due to conflicting dialects might also explain the relatively poorer IQ achievement of the Negro SES III children.

¹This interpretation is similar to a theoretical position described by Susan Irvin in an address to the Institute staff. Irvin reported on studies showing that children who speak two dialects show the same diminished efficiency in each as is seen in children who speak two languages.

The importance of dialect as a factor in Negro-white communication was further evidenced by the differential Grammatical score performance of Negro and white children on passages of Negro and white speech. Negro subjects did as well as white subjects on Negro passages, but obtained lower scores than white children did on white selections. Although the girls' passages were generally easier than the boys' paragraphs, Negro subjects did as well as, or better than, white children in replacing the identical deletions in the boys' paragraphs. This occurred even though the Negro subjects obtained lower Absolute score for the girls' paragraphs. This finding can be attributed to the fact that the only characteristically regional passage was that of the lower class Negro boy.

Receptive Language and Sex Differences

Again, the data suggested a relationship between grade level and performance. At the first grade level, there were no differences between girls and boys in the ability to comprehend teachers' speech. By the fifth grade level, girls surpassed boys in their ability to cope with grammatical structure and in the preciseness with which they understood the speech sample, irrespective of IQ score. This is particularly interesting in the light of the conflicting evidence related to sex differences in language abilities. The fact that boys did as well as the girls in gaining general understanding of the speech passage (Contextual score) indicates that conclusions

about sex differences must be very precise in identifying the language variable under consideration.

The evidence that lower class girls earned higher Grammatical scores on the teachers' speech items than did lower class boys was consistent with the findings of other studies showing that within the lower social class group, girls show an advantage over boys on various test measures (McCarthy, 1954). Similar findings appeared with regard to the children's speech Cloze task on which, in general, lower class girls performed better than did lower class boys, while there were no differences in performance when middle class boys and girls were compared. It should be noted that, in all cases, sex differences were a function of social class level.

This superior ability in the area of receptive language on the part of girls, compared to boys, can be interpreted as an outcome of the girl's identification with and time spent with the mother, whereas in the lower class home there is often not a father present with whom the boy can identify.

Evaluation of the Test Devices

It is not possible to improve upon Templin's statement that "In future studies of language skills, the modification or refinement of measurement is probably the most important consideration. The techniques used in measurement are basic in determining the type and accuracy of the results obtained" (1957, p. 149). Needed to increase our understanding of the many aspects of language functioning, are

comparisons of the same language samples analyzed in a variety of ways. Further, speech samples from the same subjects but obtained via different techniques would serve to clarify issues regarding syntax and certain functions of speech patterns.

The method used to elicit relatively spontaneous expressive speech samples, the Clown and Rocket techniques, appears to have been as satisfactory a method as any used in previous studies of children's language where the speech was obtained in a child-adult situation. The evidence for this is the general similarity of the findings to those of earlier studies. However, this is not to say that the method is ideal. That the fifth graders seemed ill at ease in the Rocket situation has previously been indicated. Further, the results suggest that for the fifth graders the task did not reach the limits of that age group's ability. Higher correlations between the type-token ratios and IQ score, at both grade levels, had been anticipated, since vocabulary measures generally do associate highly with measures of intelligence. At the fifth grade level, the correlations of type-token ratios with IQ did not reach the acceptable .05 level of significance. The differences between the two grade levels in mean TTR score, while highly significant, were numerically very slight, though it is certain that the older group possesses a wider vocabulary range than indicated. The results showed that the two grade levels, though so far apart in age, yielded proportionately the same productivity on many of the language measures. It may be that by the time children reach

the first grade, the basic organization of language has already been established. Or, it might be that the fifth graders' abilities were not fully measured. In general, although the same language variables tended to cluster together at each grade level, the first grade data showed more stable, uniform patterns than were seen in the fifth grade data. For the fifth graders, a more naturalistic setting than the Rocket task might result in even more representative speech samples.

The Cloze technique, through which an effort was made to evaluate the ability of children to comprehend the speech of their teachers and of their peers, requires further refinement for this purpose. For example, instead of deleting every nth word, it might be more productive to delete words specifically selected in order to evaluate comprehension of the syntactical requirements of the passage.

It is clear that the auditory mode of presentation was qualitatively more difficult for the children than the visual form was. Nevertheless, the auditory form deserves emphasis since it so much more closely approximates verbal interaction. The extra time required for individual administration of the auditory mode of presentation appears to be warranted.

Implications for Education

The findings of this broad study of expressive and receptive language in children have the following implications for the educator:

1. Children disadvantaged by conditions related to social class status and/or minority group membership require special training in such language areas as vocabulary development, general ease in self-expression leading to lengthy but meaningful verbalization, greater exactness in sound discrimination and in precision in the use of language.

2. This research shows the close relationship between intelligence, as measured by standardized IQ tests, and language skills. Previous studies suggest that improving language skills can raise IQ scores.

3. Different subgroups of first grade children tend to be more similar in their general language functioning than are fifth grade children. It is therefore important to emphasize language development at as early an age as possible.

Implications for Further Research

Suggestions for further research arising from the current study include the following:

1. The children who participated in the present investigation of expressive language were included in the research project of a larger study, and parent interview data have been collected for each child. To gain further insights into the conditions related to higher IQ and language scores, it would be valuable to investigate these data from pupils of the lowest social class group who scored highest and lowest on the language variables.

2. Longitudinal studies utilizing the Clown technique with the same children at different levels of their development, comparing the results to their general classroom and academic functioning, would serve to clarify the functions measured by the device.

3. Since the content of the expressive language samples of all the children was strikingly similar, it would be desirable to devise test situations which simultaneously maximize idiosyncratic content and lend themselves to standardized procedures.

4. Further analysis of the current expressive language samples might include the measurement of speech pauses defined by Bernstein (1962) as "hesitation phenomena." Bernstein has found that hesitations between speech sequences are related to levels of verbal planning, or speech complexity. His research, based on British working class adolescents, has shown provocative relationships between social class level and hesitation phenomena.

5. Further studies of expressive language behavior should include assessments of the influence of the examiner's sex, race, and social class characteristics on the children's responses.

VII. Summary

The major findings of the Expressive and Receptive Language Studies may be summarized as follows:

1. While fifth grade children were found to be more productive on every language measure than first graders were, in general the proportion of any language score to the total output of speech was the same at both grade levels.

2. Three relatively discrete factors of interrelated language and/or demographic variables were obtained for each of the two age groups studied. These clusters indicated that: a) Many of the traditional language measures yielded overlapping results owing to their high degree of dependence on total speech productivity. b) Range of oral vocabulary tended to be relatively independent of other language measures and showed a positive relationship to social class level. While the higher social class group demonstrated a wider range of oral vocabulary than did the lower class group, this relationship was not maintained when differences in IQ score were controlled. c) The mean sentence length measure was related to social class level among younger children but not among the older group. Lower class first graders tended to use shorter sentences than a comparable age group of higher social class subjects. d) At the fifth grade level the race variable was related to intelligence, reading skill, and sound discrimination test scores but not to the language measures of this research. At the first grade level, the race variable was related to neither the language nor the other test measures.

3. The content of children's speech obtained in a relatively unstructured adult-child testing situation was, in general, not significantly influenced by variables of sex, race, or social class level. Older children, who talked considerably more than the younger children did within a specified period of time, were found to cover a wider range of topics rather than to discuss any one topic more fully than did the younger group.

4. The results of this research, compared with those of previous studies, suggest that the appearance of sex differences in language performance is highly dependent on the age and social class level of the subject and on the specific linguistic skill measured.

5. Where social class or racial differences in language performance appeared, they were usually found in conjunction with significant differences in performance on the Lorge-Thorndike IQ Tests. The language performance of fifth grade children, compared with first grade subjects, was somewhat more sensitive to the influence of social class and race variables.

APPENDIXES AND REFERENCES

APPENDIX I. THE DEVELOPMENT AND USE OF THE INDEX OF SOCIOECONOMIC STATUS

The Index of Socioeconomic Status

As indicated in the body of the report, an essential variable of this study was social class. The social class index, as formulated at the Institute for Developmental Studies, was used to assign social class ratings.

The Institute index, which was developed on a total sample of 292 Negro and white children, represents an objective approach to the estimation of an individual's socioeconomic status. The index consists of two components: (1) the educational level of the main support in a family; and (2) a prestige rating of his occupation.

The education variable was divided into eight categories from 1 (0-4 years of school) to 8 (graduate training). Each occupation was given a rating of 1 (lowest prestige) to 10 (highest prestige) on the basis of the scale constructed by Empey (1956) from the prestige ratings gathered by Smith (1943) and by Hatt and North (1953).

The distribution of educational and occupational ratings were treated as if they represented parametric data, and the ratings were converted into standard scores. A social class score was obtained by adding the two derived scores. The resulting distribution of scores was trichotomized into the following three levels:

A. Social Class Level I (SES I) - Characterized by households in which the main wage earner is either unemployed, holds

an unskilled job, or, at most, holds a semi-skilled job. His educational attainment is likely to range from elementary school up to the ninth grade.

B. Social Class Level II (SES II) - Characterized by households in which the main wage owner holds a semi-skilled, clerical, sales, or, at most, a skilled job. He is likely to have had an education ranging from the seventh or eighth grade up to completing high-school.

C. Social Class Level III (SES III) - Characterized by households in which the main wage earner is likely to hold a skilled, professional, or managerial position. His education is likely to range from high-school graduation up to college graduation or graduate training.

The index as currently used for research purposes shows a moderate degree of internal cohesiveness. The correlation between the educational level of the main breadwinner and the prestige rating of his occupation was $+ .60$. The observed relationship suggests that no excessive redundancy exists between the two components of the social class index. It therefore appears that the measurement of social class involves an assessment of two relatively different dimensions which are tapping one underlying continuum.

Data have been collected relevant to the validity of the social class index (Bloom, Whiteman & Deutsch, 1963). The index has considerable construct validity. The respondents in SES I, II, and III were compared on a number of variables and significant differences, in the expected direction, were found in many areas.

SES I - Lower Class (LC) was found to be significantly different ($p < .05$) from SES III - Middle Class (MC) on the following sample of variables:

1. Degree of crowdedness in the household (LC > MC)
2. Degree of dilapidation of the neighborhood surrounding the household (LC > MC)
3. Parental aspirations for the child's first job (MC > LC)
4. Amount of education desired by the parent for the child (MC > LC)
5. Child's aspirational level (MC > LC)
6. Parental perception of own improvement (MC > LC)
7. Actual improvement in job mobility of main support of the household (MC > LC)
8. Absence of father in the home (LC > MC)
9. Father as source of the main support (MC > LC)
10. Nutritional adequacy (operationally defined) of child's breakfast (MC > LC)
11. Total "cultural" (operationally defined) activities by child over weekend (MC > LC)

Additional data suggest the index has comparability for both Negro and white samples. The sample of 292 was so selected that there were equal proportions of Negro and white households distributed among the three social class levels.

It was thus possible to make comparisons of race and social class as separate as well as joint determiners of environmental conditions. In general, there were very few instances of significant interaction of race, social class, and a given dependent variable.

APPENDIX II. DIRECTIONS FOR ADMINISTERING THE CLOWN AND ROCKET TECHNIQUES

A. Clown Technique Administration Manual

I. Materials:

1. Large opaque screen on the table which separates subject and examiner.
2. Papier-maché head of the Clown with a red bulb for a nose (on subject's side).
3. Silent light switch which controls the red bulb (on examiner's side).
4. Tape recorder (on examiner's side). (See Tape Recorder Manual.)
5. Recorded tape of instructions to be played to the subject.
6. Microphone concealed in Clown's collar.
7. Stopwatch.
8. Story book about Happy the Clown.
9. Approximate time: fifteen minutes.

II. Procedure:

The child is brought into the room by the examiner. The examiner says: LET'S SIT OVER HERE. I'D LIKE TO READ YOU A STORY ABOUT HAPPY THE CLOWN. O.K.? The examiner seats the child at a table and sits near the child. The examiner then reads the story of Happy the Clown, showing the subject the pictures in the book. (See the Story of Happy the Clown.) After the examiner reads the story, he says: NOW LET'S MEET HAPPY. The examiner takes the subject over to the Clown apparatus and seats the child so that he is facing the clown. He is told to wait for instructions: YOU WAIT A MINUTE AND

HAPPY WILL TELL YOU WHAT TO DO. The examiner then goes behind the screen and starts the taped instructions, which is the "Voice" of the Clown. (See Instructions Spoken by the Clown. If the child does not respond when the Clown asks, "What's your name?" the examiner should stop the tape and say to the child: TELL HAPPY YOUR NAME. The examiner should also light the Clown's nose every time the child answers the Clown.)

As soon as the tape instructions are finished, the examiner advances the tape to a fresh portion of tape for recording. Then the examiner says, NOW YOU CAN BEGIN TALKING! The examiner starts the tape recorder and the stopwatch simultaneously. It is important that the examiner turn on the light switch and leave it on as long as the child speaks. As soon as the child stops, the examiner turns the switch off. The reinforcement follows the speech of the child. If the child is silent at any point for more than ten seconds, the examiner should use the following list of probes in this order:

1. CAN YOU GET HAPPY'S NOSE TO LIGHT UP? TRY.
2. CAN YOU MAKE THE CLOWN HAPPY? TRY.
3. THE CLOWN IS SAD. CAN YOU MAKE HIM HAPPY? TRY.
4. TELL HIM ANYTHING YOU WANT TO.
5. HAPPY IS WAITING FOR YOU.

If the child keeps repeating the same response, then use this probe:

6. IS THERE ANYTHING ELSE YOU WANT TO TELL HAPPY?

The examiner should be sure to turn on the light switch when the child answers his probes. If the examiner uses the fifth and sixth probes before the allotted recording time is over, he should repeat the probes in order.

Exactly five minutes of recorded time is allowed. The examiner should keep careful track of the time, both in respect to the five minutes of recording time and to the silence intervals so that he knows when to use a probe.

THE STORY OF HAPPY THE CLOWN

There once was a clown named Happy, who wasn't happy at all. He lived in a place where there were no children. Nobody ever talked to him and he was very sad. One day he decided not to be alone any more. So he took a trip out into the world to see if he could find some children who would talk to him.

First he took a boat all the way to China. The first thing he saw when he got there was a whole bunch of children walking on the street. "Oh, look," they said, "there's a clown. Hello, what's your name?" The clown greeted them joyfully, "My name is Happy," and suddenly the children saw a very exciting thing -- Happy's nose lit up, bright and red and sparkling. Happy couldn't believe it himself. "Oh, my," he said, "now that the children have talked to me I'm so happy that my nose lights up. Thank you very much for talking to me, children!"

They all had a wonderful afternoon talking to Happy and telling him all about themselves and what they did in school. And each of them was so pleased when Happy's nose lit up because it showed them that the things they were telling him made him happy indeed.

From there, Happy went to France, to Italy, to Spain, to England, and in each place he found that children everywhere talked to him and made him happy.

On the ship coming back to New York, Happy found many children to talk to and promised to visit their school as soon as he could.

The very next day Happy walked into P.S. _____. He started up the stairs and after climbing a long way he came to a door at the

top. He knocked and opened the door and found two teachers sitting in the room, and after he told them his story they promised to bring him some children to talk to him.

INSTRUCTIONS SPOKEN BY THE CLOWN

I'm so happy, I'm so happy, I'm so hap-pa-pa ha-pa-pa happy. Whoops, well, hi there. My name is Happy. What's yours?* That's a nice name. Say, how do you like my new hat?* Well, you know, this is my happy hat and I'm wearing it because I'm so happy to be here. (Light.) How do you like that? Every time I'm happy my nose lights up. Say, would you like to play a game with me, because we can have lots of fun together? Why don't you try to make me happy so my nose lights up? All you have to do is talk to me. You can tell me a story. You can tell me what you'd like to be when you grow up, what you do here in school, about your friends, and anything else you want to say to me. If you make me very, very happy, you will get a special prize at the end of the game. See them over there? Now do you understand the rules of the game? You're supposed to talk to me and try to make me happy and my nose will light up. I'll only light up when you talk and make me happy. Okay? You wait a minute for my friend to tell you when to begin.

-141-

*Examiner stops tape recorder until child responds.

B. Rocket Technique Administration Manual

I. Materials:

1. Rocket apparatus mounted on "sky" board.
2. Sound-deadening box for motor.
3. Six-volt battery.
4. Tape recorder (on examiner's side). (See Tape Recorder Manual.)
5. Microphone mounted on desk in front of subject.
6. Stopwatch.
7. Approximate time: fifteen minutes.

II. Procedure:

Before the subject is brought into the room, the examiner turns on the rocket motor, making sure that the gear switch is in the neutral position and that the light switch is in the neutral position. The examiner also switches the tape recorder on and adjusts it for recording. (See Tape Recorder Manual.)

The subject is then brought into the room by the examiner and is seated in front of the rocket apparatus. The examiner says: WE ARE GOING TO PLAY A GAME. YOUR JOB IS TO TRY TO GET THE ROCKET TO MOVE TOWARD THE MOON. ALL YOU HAVE TO DO IS TALK. YOU CAN SAY ANYTHING YOU WANT TO. YOU CAN MAKE UP A STORY. YOU CAN TELL WHAT YOU'D LIKE TO BE WHEN YOU GROW UP, WHAT YOU DO HERE IN SCHOOL, ABOUT YOUR FRIENDS, AND ANYTHING ELSE YOU WANT TO SAY.

WHENEVER YOU TALK, THE ROCKET'S TAIL WILL LIGHT UP AND IT WILL MOVE TOWARD THE MOON. DO YOU UNDERSTAND THE RULES OF THE GAME?

WHENEVER YOU TALK, THE ROCKET'S TAIL WILL LIGHT UP AND IT WILL MOVE TOWARD THE MOON. NOW, YOU JUST WAIT UNTIL I TELL YOU WHEN TO BEGIN TALKING.

The examiner then goes behind the rocket panel. When all is ready, the examiner says: ALL RIGHT. BEGIN! and starts the tape recording. As soon as the subject speaks, the examiner pushes the black lever (turning on the taillight) to the right with one hand and simultaneously pushes the gear switch of the motor one notch to the right, causing the rocket to rise.

Whenever the subject stops talking, the examiner pushes the black lever to its NEUTRAL (middle) position and simultaneously pushes the gear switch of the motor one notch to the LEFT (to its neutral position). Thus, reinforcement follows the subject's speech.

If the child is silent at any time for more than ten seconds, the examiner should use the following probes in the order listed:

1. CAN YOU MAKE THE ROCKET LIGHT UP AND MOVE TOWARD THE MOON?
2. YOU CAN SAY ANYTHING YOU LIKE AND THE ROCKET WILL MOVE. GO AHEAD.
3. YOU CAN MAKE THE ROCKET GO HIGHER THAN THAT. GO AHEAD AND TRY.

The rocket's movement is calibrated so that if the subject speaks for exactly six minutes, it will reach the moon. Exactly ten minutes of recorded time is allowed. When the plastic tube projecting through the slot reaches the heavy red line drawn next to the slot, the examiner will shut off the rocket motor and push the black light lever all the way to the LEFT, causing the moon to light up.

APPENDIX III. CRITERIA FOR SCORING THE EXPRESSIVE LANGUAGE DATA

A. Linguistic Analysis of Clown and Rocket Data:

Definitions of Language, Demographic, and Other Test Measures

Variable No.		Definition of Variable
First Grade	Fifth Grade	
1.	1.	tvo: Total verbal output--total number of words spoken, including repetitions, during first minute of recording.
2.	2.	TVO: Total number of words spoken, including repetitions, during first five minutes of recording time.
3.	3.	TTR (initial): Type Token Ratio--of the first 100 words, the ratio of the number of different words spoken to 100.
4.	4.	TTR (final): ¹ Of the final 100 words, the ratio of the number of different words spoken to 100.
5.	5.	Total Number Nouns: Number of nouns, including repetitions, within the TVO (five minutes of speech).
6.	6.	Total Number Verbs: Same as above--number of verbs.
7.	7.	Total Number Adjectives: Same as above--number of adjectives.
8.	8. ²	Total Number Adverbs: Same as above--number of adverbs.

¹For the analyses of variance and covariance, the average of the initial and final TTR was used. Occasionally a protocol consisted of fewer than 100 or 200 words, and the child's actual ratio was used.

²Items 5 through 8 account for all words used except pronouns, articles, conjunctions, and prepositions which were not evaluated in this study.

APPENDIX III A continued

Variable No.		Definition of Variable
First Grade	Fifth Grade	
9.	9.	Total Number Sentence Units: Number of sentence units given within the five-minute period. A sentence unit was defined as grammatically and/or functionally complete simple and complex sentences. No attempt was made to classify compound sentences because of the difficulty encountered in determining whether connectives between independent clauses were used for structural reasons or represented nervous mannerisms.
10.	10.	Total Number Extraneous Words (within five minutes): An extraneous word is a repetition, error or slip occurring <u>within</u> a sentence unit and subsequently corrected by the child. If these words were counted in determining the length of a sentence unit, the length would be spuriously increased.
11.	11.	Total Number Maze Words (within five minutes): A maze word is defined as a false start, or repetition (particularly of connectives or such words as "and then"), occurring between sentences.
12.	12.	Mean Sentence Length (within five minutes): The average number of words per sentence unit, excluding connectives and extraneous words.
13.	13.	Wepman Error Score "Different" Items: Cases on the Wepman task where child responded with "the same" when the correct response was "different." A high score represents many errors.
14.	14.	Sex: In these analyses, male is coded as "1" and female as "2."
15.	15.	IQ Scores: Score on Lorge-Thorndike Intelligence Test.
16.	16.	Race: Negro is coded as "2" and white as "1."

APPENDIX III A continued

Variable No.		Definition of Variable
First Grade	Fifth Grade	
17.	17.	Total Number Dependent Clauses (within five minutes): The number of dependent clauses.
18.	18.	Total Number all Clauses (within five minutes): The number of dependent and all other clauses used.
19.	19.	SES: Decimal rating.
--	20.	Reading Score: Score on Gates Advanced Primary Paragraphs--available for fifth graders only.

B. Computing the Type Token Ratio

The following passage, 100 words in length, is the basis for the TTR computed below.

... Pauses

--- Word/words not understood

(E:) Probes

Hello goodbye...how are you...nice...house...having a good time...
going to camp this summer...hope you have a wonderful time...I like
I like to swim...uh hello...what's your name...I'm fine...how do you
feel...hi...hello goodbye (E: Gerald, you can say anything you want
to.) I know I know (he shouted this) (E: You can talk about any-
thing you want to and the rocket will move.) My name is Gerald I'm
going to camp this summer by bus in Connecticut (first minute). I
hope you have a good time this summer...I like school...I like to
talk about science, meteorology, transportation, buses, cars, trains
...transportation...model I like model railroads and building models
reading books, going to the library...and...

$$\text{TTR} = \frac{\text{number of different words used}}{\text{total number of words evaluated}} = \frac{55}{100} = .55$$

C. Criteria for Scoring Sentences

Since the child delivered something in the nature of a monologue, his speech pattern was full of such connectives as "and," "and then," and "so." Under the pressure of the test situation, the child often strung all his remarks together with "and" or "so," thus making it difficult to judge whether the connective was merely a nervous mannerism or whether it was used for structural reasons--i.e., to construct a compound sentence. For this reason, no attempt was made to classify the sentences of compound elaborations built with connectives. Instead, a sentence was defined as a unit of expression consisting, in its most common form, of a subject and its predicate (verb), with or without modifiers. The specific criteria established as guides for coding sentences were as follows:

1. A unit of expression in which the verb was omitted entirely was not coded as a sentence unit, e.g., "You a pretty clown."
2. If a child omitted an auxiliary verb or used the incorrect form of the verb, he nevertheless received full credit for the sentence unit, e.g., "Somebody sitting in my chair." "I never be bad last year." "The father bear say it's too hot."
3. The functionally complete word group which does not contain an expressed predicate, but which nonetheless conveys a complete thought, was coded as a sentence unit. This often occurred in answer to a question (either to a self-question or to the Examiner's

probe), e.g., "Yes." "No." "Hello." "Good-bye." "All right."
"You know what I want to be when I grow up? A dentist." (Seven
sentence units.)

D. Criteria for Scoring Clauses

Definitions of Clauses:

1. An independent or main clause is a group of words containing a verb and its subject which can stand alone as a simple sentence.
2. A dependent clause is a group of words containing a verb and its subject which enter into the sentence structure with the force of a part of speech--i.e., as a noun, adjective or adverb.

Sources of Possible Confusion:

1. Direct quotations were coded in the following manner:

Independent Dependent Dependent
The papa bear said,/"When the fire is ready/we will cook
the porridge/Independent
and then we will eat it."

2. Dependent clauses not introduced by a subordinating conjunction:

Independent Dependent
You should make sure/you have the antenna clipped.

3. Subordinating conjunction introducing more than one clause:

Independent Dependent
...always like Miss Barry/because she always used to give
us parties/Dependent
and she always used to buy us things.

Dependent Dependent
When I'm not paying attention to my work/and the teacher
calls on me/Independent
they give me the wrong answer.

E. Scoring Parts of Speech

Because of its emphasis on the structural aspects of speech and its discussion of the four classes of speech (nouns, verbs, adjectives, and adverbs) within the framework of the sentence, Fries' Structure of English (1952) was used in evaluating the Clown and Rocket protocols. The book was particularly helpful in assigning ambiguously used words to particular parts of speech. Hodge's Handbook of English (1959) provided a reliable reference for rules of English grammar.

APPENDIX IV. ANALYSIS OF VARIANCE AND COVARIANCE

EXPRESSIVE LANGUAGE DATA NOT REPORTED IN TEXT

APPENDIX TABLE 1.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ) on Grade 1 Mean Sentence Length

Source	Analysis of Variance			Analysis of Covariance		
	d.f.	Mean Square	F	d.f.	Mean Square	F
SES	2	392	1.00	2	40,017	1.00
Race	1	554	1.40	1	58,267	1.45
SES x Race	2	1,230	3.12	2	124,515	3.11
Within	56	394				

APPENDIX V. CRITERIA FOR CONTENT ANALYSIS OF
CLOWN AND ROCKET PROTOCOLS

A (School)

- A₁ Physical Description--of classroom, building, or surroundings, e.g., "They'll be pastel colors." (Referring to rooms in new school.)
- A₂ School Activities--all activities that are part of child's school day excluding studies (e.g., gym, assembly, trip, recess), e.g., "In assembly, we saw a play."
- A₃ Studies--any academic school subject, e.g., "We learned homonyms and synonyms."
- A₄ Teacher Identification--objective identification, including name, physical appearance, etc., e.g., "My teacher's name is Miss Jamison."
- A₅ Teacher Description--description of activities and behavior, but not in relation to the child, e.g., "The teachers had a coffee break on Friday."
- A₆ Teacher Interaction--interaction between teacher and child; also, any feelings or opinions about the teacher expressed by the child, e.g., "My teacher is very nice....He teaches us a lot."
- A₇ Miscellaneous--anything within the school context that does not pertain to the other categories, e.g., "I've been in this school for two years."

B (Family)

- B₁ Physical Description of Home--appearance of house, apartment, or yard, e.g., "I live in a big house."
- B₂ Home Routine--daily routine engaged in by the child, including meal times, hours of rising and retiring, household chores, dressing, etc., e.g., "I woke up after seven o'clock. I washed up."
- B₃ Family Members' Identification--objective identification, including name, age, physical appearance, relationship to child, job, etc., e.g., "My sister's name is Mary. She is ten."
- B₄ Family Members' Description--description of activities and behavior not involving interaction with child, e.g., "My sister she is usually sleeping."
- B₅ Family Members' Interaction, General--interaction between any immediate family members or relatives and the child; includes feelings or opinions expressed by the child about family members, e.g., "I went shopping with my mother."
- B₆ Family Members' Interaction--Trips, Vacation--interaction as stated above, but only in the context of special situations, such as trips, vacations, excursions, e.g., "I've been to Puerto Rico. We had a lot of fun."

C (Friends)

- C₁ Friends' Identification--objective identification, including name, age, address, physical appearance, grade in school, etc., e.g., "I have a friend Eileen."
- C₂ Friends' Description--description of activities and behavior not involving interaction with child, e.g., "Joy is absent. She had to go to church."
- C₃ Friends' Interaction, General--interaction between the child and his friends, including feelings and opinions expressed by the child about his friends, e.g., "We went to a spook house. Eileen screamed."
- C₄ Friends' Interaction: Clubs, Camp--interaction as stated above, but pertaining only to planned group activities, e.g., "I go to Little League. We practice every day."

D (Leisure-Time Activities and Interests)

- D₁ Independent Activities and Interests--activities the child pursues for the most part independently--with the exception of reading--such as riding a bike, doing homework, playing alone, e.g., "I'll ride my bike this afternoon."
- D₂ Reading--not including textbooks, or the retelling of the story of a book, e.g., "I like to read mysteries."

- D₃ Hobbies--collecting butterflies, baseball cards, etc.; e.g.,
"I collect butterflies. It's my hobby."
- D₄ Entertainment--TV, radio, movies, sports event, circus,
museum, zoo, etc., e.g., "I saw 'Mr. Ed' and 'Walt Disney'
on TV."
- D₅ Miscellaneous--interests and activities not pertaining to the
other categories, e.g., "I like trees and nature very much."

E (Story Telling)

- E Retelling of a story from a book, a movie, or TV (but not the
telling of an original story), e.g., "Once upon a time there
was three bears."

F (Fantasy)

- F₁ When I grow up--any mention of the child's future plans, e.g.,
"When I grow up I want to be a parachute jumper."
- F₂ Other--would be concerned with imaginative treatment of the
present situation or any other theme. This could include
original stories, role playing of other characters, and con-
juring up actors with whom the child carries on some kind of
dialogue, e.g., "I have an oxygen tank on my back. It's
heavy." "Calling all cars!" "Countdown 10, 9,..."

G (Immediate Situation)

- G₁ Observation of Test Setup--child's observations of the test apparatus, room, etc., e.g., "In front of me, I see a rocket." "It stopped moving."
- G₂ Interaction with Examiner--comments and questions directed to the examiner, e.g., "I don't know what to say."
- G₃ Development of Topics Related to Test--discussion of rockets and clowns and related subjects--does not include observation of specific rocket or clown of test situation, e.g., "In circuses they have clowns." "Sheppard is an astronaut."
- H (Description of Environment--Exclusive of School and Home)
- H Description of a city, town, vacation area, building, etc., e.g., "Lake Lucerne is near Lake George."

I (Self-Identification)

- I Name, age, address, physical description, or any other objective description of the self, e.g., "My name is Dick. I live in Apartment 1C."

J (Miscellaneous)

- J Miscellaneous conversation--i.e., not otherwise scored ,
e.g., "On Friday I have to get a haircut."

K (Conversation with Clown)

- K Talking directly to the clown as if it were a person , e.g.,
"Do you have a wife?"

**APPENDIX VI. SAMPLE WORKSHEET FOR COMPUTING
 χ^2 FOR MIXED-MODEL THREE-WAY ANALYSIS**

χ^2 for Mixed-Model (A and B restricted, C random)

Three-Way Tables

Variable A--

Variable B--

Variable C--

	χ^2	d.f.		p
Total		(5) (pq-1)	() (r-1)	
AC		(1) (p-1)	() (r-1)	
BC		(2) (q-1)	() (r-1)	
ABC		(1) (p-1)	(2) (q-1)	() (r-1)

Total

	First			Fifth			Total
	I	II	III	I	II	III	

Total

APPENDIX VI continued

O-E	E	$\Sigma(O-E)^2/E$

$\chi^2 = \underline{\hspace{2cm}}$

B C

			Total

O-E	E	$\Sigma(O-E)^2/E$

$\chi^2 = \underline{\hspace{2cm}}$

APPENDIX VII. EXPRESSIVE LANGUAGE CONTENT ANALYSIS:
TABLES OF FREQUENCIES AND NONSIGNIFICANT CHI SQUARE RESULTS

APPENDIX TABLE 2.--Frequencies and χ^2 s for School
Grade Differences in Content Responses

Content		First Grade (N = 62)	Fifth Grade (N = 105)	χ^2
A ₂	(Yes)	19	48	3.68
	(No)	43	57	
B ₂	(Yes)	9	20	.56
	(No)	53	85	
B ₄	(Yes)	10	28	2.47
	(No)	52	77	
B ₆	(Yes)	3	14	3.07
	(No)	59	91	
D ₄	(Yes)	10	28	2.46
	(No)	52	77	
E	(Yes)	17	17	3.03
	(No)	45	88	
G ₁	(Yes)	10	22	.58
	(No)	52	83	
G ₃	(Yes)	3	14	3.09
	(No)	59	91	

APPENDIX TABLE 3.--Frequencies and χ^2 s for
SES Differences in Content Responses
(Grade 1, N = 62; Grade 5, N = 105)

Content	Grade		SES Level			χ^2
			I	II	III	
A ₂	1 and 5	(Yes) (No)	21 39	24 29	22 32	1.58
A ₃	1 and 5	(Yes) (No)	23 37	24 29	23 31	.57
A ₃	5	(Yes) (No)	15 23	17 14	18 18	1.74
A ₄	1 and 5	(Yes) (No)	6 54	7 46	3 51	1.82
A ₆	1 and 5	(Yes) (No)	16 44	13 40	13 41	.12
A ₆	5	(Yes) (No)	16 22	12 19	10 26	1.76
A _{4,5,6}	5	(Yes) (No)	19 19	16 15	10 26	5.10
B ₂	1 and 5	(Yes) (No)	9 51	13 40	7 47	2.86
B ₄	1 and 5	(Yes) (No)	14 46	9 44	15 39	1.79
B ₅	1 and 5	(Yes) (No)	24 36	14 39	21 33	2.71
B ₅	5	(Yes) (No)	18 20	10 21	15 21	1.63
B ₆	1 and 5	(Yes) (No)	6 54	4 49	7 47	.86

APPENDIX VII, TABLE 3 continued

Content	Grade		SES Level			χ^2
			I	II	III	
B _{3,4,5,6}	5	(Yes) (No)	23 15	15 16	20 16	1.01
C ₁	1 and 5	(Yes) (No)	15 45	12 41	12 42	.14
C ₁	5	(Yes) (No)	13 25	12 19	9 27	1.52
C ₂	1 and 5	(Yes) (No)	12 48	7 46	7 47	1.36
C ₃	1 and 5	(Yes) (No)	30 30	24 29	24 30	.41
C ₃	5	(Yes) (No)	24 14	21 10	18 18	2.43
C ₄	1 and 5	(Yes) (No)	8 52	8 45	10 44	.60
C _{1,2,3,4}	1	(Yes) (No)	7 15	4 18	7 11	2.18
C _{1,2,3,4}	5	(Yes) (No)	30 8	23 8	23 13	2.19
D ₁	1 and 5	(Yes) (No)	19 41	15 38	13 41	.80
D ₁	5	(Yes) (No)	16 22	13 18	7 29	5.35
D ₂	1 and 5	(Yes) (No)	3 57	6 47	6 48	1.82
D ₃	1 and 5	(Yes) (No)	6 54	7 46	8 46	.62

APPENDIX VII, TABLE 3 continued

Content	Grade		SES Level			χ^2
			I	II	III	
D ₄	1 and 5	(Yes)	15	12	11	.34
		(No)	45	41	43	
D _{1,2,3,4,5}	1	(Yes)	6	6	7	.79
		(No)	16	16	11	
D _{1,2,3,4,5}	5	(Yes)	23	24	22	2.68
		(No)	15	7	14	
E	1 and 5	(Yes)	9	13	12	1.75
		(No)	51	40	42	
F ₁	1 and 5	(Yes)	22	19	21	.11
		(No)	38	34	33	
F ₁	5	(Yes)	18	12	16	.53
		(No)	20	19	20	
G ₁	1 and 5	(Yes)	11	11	10	.12
		(No)	49	42	44	
G ₂	1 and 5	(Yes)	37	32	32	.07
		(No)	23	21	22	
G ₂	1	(Yes)	15	15	14	.57
		(No)	7	7	4	
G ₂	5	(Yes)	22	17	18	.46
		(No)	16	14	18	
G ₃	1 and 5	(Yes)	4	8	6	2.09
		(No)	56	45	48	
G _{1,2,3}	1	(Yes)	15	17	15	1.28
		(No)	7	5	3	
G _{1,2,3}	5	(Yes)	26	21	21	.99
		(No)	12	10	15	
I	1 and 5	(Yes)	13	12	9	.68
		(No)	47	41	45	
K	1	(Yes)	10	14	9	1.56
		(No)	12	8	9	

APPENDIX TABLE 4.--Frequencies and χ^2 s for Racial Differences in
Content Responses (Grade 1, N = 62; Grade 5, N = 105)

Content	Grade		Negro	White	χ^2
A_2	1 and 5	(Yes) (No)	34 53	33 47	.08
A_2	5	(Yes) (No)	27 31	21 26	.04
A_3	5	(Yes) (No)	23 35	27 20	3.29
A_4	1 and 5	(Yes) (No)	10 77	6 74	.76
A_6	1 and 5	(Yes) (No)	25 62	17 63	1.24
A_6	5	(Yes) (No)	23 35	15 32	.67
$A_{4,5,6}$	5	(Yes) (No)	26 32	19 28	.20
B_2	1 and 5	(Yes) (No)	19 68	10 70	2.53
B_3	1 and 5	(Yes) (No)	18 69	15 65	.10
B_4	1 and 5	(Yes) (No)	20 67	18 62	.00
B_5	1 and 5	(Yes) (No)	35 52	24 56	1.90
B_5	5	(Yes) (No)	28 30	15 32	2.88
B_6	1 and 5	(Yes) (No)	6 81	11 69	1.14
$B_{3,4,5,6}$	1	(Yes) (No)	9 20	17 16	2.67

APPENDIX VII, TABLE 4 continued

Content	Grade		Negro	White	χ^2
B _{3,4,5,6}	5	(Yes) (No)	33 25	25 22	.14
C ₁	1 and 5	(Yes) (No)	19 68	20 60	.23
C ₁	5	(Yes) (No)	18 40	16 31	.11
C ₂	1 and 5	(Yes) (No)	14 73	12 68	.04
C ₃	1 and 5	(Yes) (No)	39 48	39 41	.26
C ₃	5	(Yes) (No)	35 23	28 19	.01
C ₄	1 and 5	(Yes) (No)	13 74	13 67	.05
C _{1,2,3,4}	1	(Yes) (No)	5 24	13 20	3.70
C _{1,2,3,4}	5	(Yes) (No)	41 17	35 12	.18
D ₁	1 and 5	(Yes) (No)	26 61	21 59	.27
D ₁	5	(Yes) (No)	22 36	14 33	.76
D ₂	1 and 5	(Yes) (No)	7 80	8 72	.19
D ₃	1 and 5	(Yes) (No)	11 76	10 70	.00
D ₄	1 and 5	(Yes) (No)	22 65	16 64	.66

APPENDIX VII, TABLE 4 continued

Content	Grade		Negro	White	χ^2
$D_{1,2,3,4,5}$	1	(Yes) (No)	7 22	12 21	1.09
$D_{1,2,3,4,5}$	5	(Yes) (No)	42 16	27 20	2.59
E	1 and 5	(Yes) (No)	18 69	16 64	.01
F_1	1 and 5	(Yes) (No)	30 57	32 48	.54
F_1	5	(Yes) (No)	23 35	23 24	.91
G_2	1 and 5	(Yes) (No)	55 32	46 34	.57
G_2	1	(Yes) (No)	21 8	23 10	.11
G_2	5	(Yes) (No)	34 24	23 24	.98
G_3	1 and 5	(Yes) (No)	12 75	5 75	2.59
$G_{1,2,3}$	1	(Yes) (No)	23 6	24 9	.33
$G_{1,2,3}$	5	(Yes) (No)	42 16	26 21	3.33
I	1 and 5	(Yes) (No)	19 68	15 65	.25
K	1	(Yes) (No)	19 10	14 19	3.30

APPENDIX TABLE 5.--Frequencies and χ^2 s for
Sex Differences in Content Responses^s
(Grade 1, N = 62; Grade 5, N = 105)

Content	Grade		Male	Female	χ^2
A ₂	1 and 5	(Yes) (No)	33 58	34 42	1.24
A ₃	1 and 5	(Yes) (No)	37 54	33 43	.13
A ₄	1 and 5	(Yes) (No)	8 83	8 68	.14
B ₂	1 and 5	(Yes) (No)	17 74	12 64	.24
B ₃	1 and 5	(Yes) (No)	16 75	17 59	.59
B ₄	1 and 5	(Yes) (No)	19 72	19 57	.40
B ₅	1 and 5	(Yes) (No)	28 63	31 45	1.82
B ₆	1 and 5	(Yes) (No)	6 85	11 65	1.77
C ₁	1 and 5	(Yes) (No)	19 72	20 56	.68
C ₃	1 and 5	(Yes) (No)	40 51	38 38	.61
C ₄	1 and 5	(Yes) (No)	15 76	11 65	.13
D ₁	1 and 5	(Yes) (No)	24 67	23 53	.31
D ₂	1 and 5	(Yes) (No)	9 82	6 70	.20

APPENDIX VII, TABLE 5 continued

Content	Grade		Male	Female	χ^2
D ₃	1 and 5	(Yes) (No)	12 79	9 67	.09
D ₄	1 and 5	(Yes) (No)	26 65	12 64	3.72
E	1 and 5	(Yes) (No)	18 73	16 60	.04
F ₁	1 and 5	(Yes) (No)	36 55	26 50	.51
G ₁	1 and 5	(Yes) (No)	20 71	12 64	1.02
G ₂	1 and 5	(Yes) (No)	54 37	47 29	.11
G ₃	1 and 5	(Yes) (No)	13 78	4 72	3.69
I	1 and 5	(Yes) (No)	21 70	13 63	.91
K	1	(Yes) (No)	21 19	12 10	.31

APPENDIX TABLE 6.--Frequencies and χ^2 s for Grade by SES Interactions
in Content Responses (Grades 1 and 5, N = 167)

Content		SES Level						χ^2
		First Grade			Fifth Grade			
		I	II	III	I	II	III	
A ₃	(Yes)	8	7	5	15	17	18	1.34
	(No)	14	15	13	23	14	18	
A ₄	(Yes)	0	1	0	6	6	3	1.00
	(No)	22	21	18	32	25	33	
A ₆	(Yes)	0	1	3	16	12	10	3.55
	(No)	22	21	15	22	19	26	
B ₃	(Yes)	1	0	6	9	7	10	1.52
	(No)	21	22	12	29	24	26	
B ₄	(Yes)	2	3	5	12	6	10	3.08
	(No)	20	19	13	26	25	26	
B ₅	(Yes)	6	4	6	18	10	15	2.12
	(No)	16	18	12	20	21	21	
B ₆	(Yes)	1	0	2	5	4	5	.51
	(No)	21	22	16	33	27	31	
C ₁	(Yes)	1	2	2	14	10	10	.97
	(No)	21	20	16	24	21	26	
C ₂	(Yes)	2	0	1	10	7	6	.64
	(No)	20	22	17	28	24	30	
C ₃	(Yes)	6	3	6	24	21	18	3.62
	(No)	16	19	12	14	10	18	
C ₄	(Yes)	1	0	1	7	8	9	.57
	(No)	21	22	17	31	23	27	
D ₂	(Yes)	1	0	1	2	6	5	2.94
	(No)	21	22	17	36	25	31	

APPENDIX VII, TABLE 6 continued

Content		SES Level						χ^2
		First Grade			Fifth Grade			
		I	II	III	I	II	III	
D ₃	(Yes)	0	1	2	6	6	6	.72
	(No)	22	21	16	32	25	30	
D ₄	(Yes)	4	3	3	11	9	8	.42
	(No)	18	19	15	27	22	28	
E	(Yes)	7	6	4	2	7	8	3.20
	(No)	15	16	14	36	24	28	
F ₁	(Yes)	4	7	5	18	12	16	1.30
	(No)	18	15	13	20	19	20	
G ₁	(Yes)	3	6	1	8	5	9	4.39
	(No)	19	16	17	30	26	27	
G ₂	(Yes)	15	15	14	22	17	18	1.11
	(No)	7	7	4	16	14	18	
G ₃	(Yes)	1	1	1	3	7	5	3.69
	(No)	21	21	17	35	24	31	
I	(Yes)	1	3	3	12	9	6	3.19
	(No)	21	19	15	26	22	30	

APPENDIX TABLE 7.--Frequencies and χ^2 s for Grade by Race
Interactions in Content Responses (Grades 1 and 5, N = 167)

Content		First Grade		Fifth Grade		χ^2
		Negro	White	Negro	White	
A ₂	(Yes)	7	12	27	21	- .09
	(No)	22	21	31	26	
A ₃	(Yes)	6	14	23	27	.71
	(No)	23	19	35	20	
A ₄	(Yes)	0	1	10	5	.00
	(No)	29	32	48	42	
A ₆	(Yes)	2	2	23	15	- .42
	(No)	27	31	35	32	
B ₃	(Yes)	3	4	15	11	.03
	No	26	29	43	36	
B ₄	(Yes)	4	6	16	12	.22
	(No)	25	27	42	35	
B ₅	(Yes)	7	9	28	15	1.27
	(No)	22	24	30	32	
B ₆	(Yes)	1	2	5	9	2.11
	(No)	28	31	53	38	
C ₁	(Yes)	1	4	18	16	.54
	(No)	28	29	40	31	
C ₂	(Yes)	1	2	13	10	.85
	(No)	28	31	45	37	
C ₃	(Yes)	4	11	35	28	2.10
	(No)	25	22	23	19	
C ₄	(Yes)	1	1	12	12	.39
	(No)	28	32	46	35	
D ₁	(Yes)	4	7	22	14	1.00
	(No)	25	26	36	33	

APPENDIX VII, TABLE 7 continued

Content		First Grade		Fifth Grade		X ²
		Negro	White	Negro	White	
D ₂	(Yes) (No)	0 29	2 31	7 51	6 41	2.85
D ₃	(Yes) (No)	1 28	2 31	10 48	8 39	.10
E	(Yes) (No)	10 19	7 26	8 50	9 38	2.14
F ₁	(Yes) (No)	7 22	9 24	23 35	23 24	.51
G ₁	(Yes) (No)	6 23	4 29	17 41	5 42	1.79
G ₂	(Yes) (No)	21 8	23 10	34 24	23 24	1.41
G ₃	(Yes) (No)	1 28	2 31	11 47	3 44	2.01
I	(Yes) (No)	3 26	4 29	16 42	11 36	3.38

APPENDIX TABLE 8.--Frequencies and χ^2 s for Grade by Sex Interactions
in Content Responses (Grade 1, N = 60; Grade 5, N =105)

Content		First Grade		Fifth Grade		χ^2
		Male	Female	Male	Female	
A ₂	(Yes)	11	8	22	26	- .49
	(No)	29	14	29	28	
A ₃	(Yes)	13	7	24	26	- .28
	(No)	27	15	27	28	
A ₄	(Yes)	1	0	7	8	- .01
	(No)	39	22	44	46	
A ₆	(Yes)	3	1	14	24	- .36
	(No)	37	21	37	30	
B ₂	(Yes)	7	2	10	10	- .04
	(No)	33	20	41	44	
B ₃	(Yes)	2	5	14	12	2.72
	(No)	38	17	37	42	
B ₄	(Yes)	4	6	15	13	2.43
	(No)	36	16	36	41	
B ₅	(Yes)	8	8	20	23	.04
	(No)	32	14	31	31	
B ₆	(Yes)	1	2	5	9	.25
	(No)	39	20	46	45	
C ₁	(Yes)	3	2	16	18	- .61
	(No)	37	20	35	36	
C ₂	(Yes)	0	3	9	14	-1.55
	(No)	40	19	42	40	
C ₃	(Yes)	9	6	31	32	- .46
	(No)	31	16	20	22	
D ₁	(Yes)	8	3	16	20	.38
	(No)	32	19	35	34	

APPENDIX VII, TABLE 8 continued

Content		First Grade		Fifth Grade		χ^2
		Male	Female	Male	Female	
D ₂	(Yes)	2	0	7	6	.45
	(No)	38	22	44	48	
D ₃	(Yes)	2	1	10	8	.46
	(No)	38	21	41	46	
D ₄	(Yes)	8	2	18	10	.44
	(No)	32	20	33	44	
E	(Yes)	11	6	7	10	.33
	(No)	29	16	44	44	
F ₁	(Yes)	13	3	23	23	1.74
	(No)	27	19	28	31	
G ₁	(Yes)	8	2	12	10	.50
	(No)	32	20	39	44	
G ₂	(Yes)	29	15	25	32	1.15
	(No)	11	7	26	22	
G ₃	(Yes)	3	0	10	4	1.45
	(No)	37	22	41	50	
I	(Yes)	5	2	16	11	1.15
	(No)	35	20	35	43	

APPENDIX TABLE 9.--Frequencies and χ^2 s for SES by Race Interactions
in Content Responses (Grade 1, N = 62; Grade 5, N = 102)

Content	Grade		SES I		SES II		SES III		χ^2
			Negro	White	Negro	White	Negro	White	
,6	5	(Yes)	9	6	12	8	6	7	.03
		(No)	13	10	7	4	11	12	
	5	(Yes)	8	7	7	10	8	10	3.41
		(No)	14	9	12	2	9	9	
	5	(Yes)	10	6	8	4	5	5	- .14
		(No)	12	10	11	8	12	14	
	5	(Yes)	10	9	11	5	5	5	.07
		(No)	12	7	8	7	12	14	
	5	(Yes)	12	6	8	2	8	7	.87
		(No)	10	10	11	10	9	12	
,5,6	5	(Yes)	14	9	9	6	10	10	.23
		(No)	8	7	10	6	7	9	
,3,4	5	(Yes)	7	6	7	5	4	5	.12
		(No)	15	10	12	7	13	14	
	5	(Yes)	13	11	12	9	10	8	1.82
		(No)	9	5	7	3	7	11	
,3,4	5	(Yes)	16	14	13	10	12	11	2.34
		(No)	6	2	6	2	5	8	
,3,4,5	5	(Yes)	10	6	8	5	4	3	- .26
		(No)	12	10	11	7	13	16	
	5	(Yes)	15	8	15	9	12	10	.08
		(No)	7	8	4	3	5	9	
	5	(Yes)	8	10	6	6	9	7	1.60
		(No)	14	6	13	6	8	12	
1		(Yes)	9	6	7	8	5	9	3.26
		(No)	2	5	5	2	1	3	

APPENDIX VII, TABLE 9 continued

Content	Grade		SES I		SES II		SES III		χ^2
			Negro	White	Negro	White	Negro	White	
G ₂	5	(Yes)	14	8	12	5	8	10	1.21
		(No)	8	8	7	7	9	9	
G _{1,2,3}	5	(Yes)	17	9	15	6	10	11	1.15
		(No)	5	7	4	6	7	8	
K	1	(Yes)	7	3	10	4	2	7	4.72
		(No)	4	8	2	6	4	5	

APPENDIX VIII. ANALYSIS OF VARIANCE ON LORGE-THORNDIKE
IQ SCORES, FIRST AND FIFTH GRADE SAMPLES,
RECEPTIVE LANGUAGE STUDY

APPENDIX TABLE 10.--Analysis of Variance on
First Grade Lorge-Thorndike IQ Scores

Source	d.f.	Mean Square	F	p
SES	1	4,356	30.68	< .01
Race	1	915	6.44	< .05
Sex	1	225	1.58	N.S.
SES x Race	1	53	.37	N.S.
SES x Sex	1	1	.01	N.S.
Race x Sex	1	1	.01	N.S.
SES x Race x Sex	1	10	.07	
Within	56	142		

APPENDIX TABLE 11.--Analysis of Variance on
Fifth Grade Lorge-Thorndike IQ Scores

Source	d.f.	Mean Square	F	p
SES	1	9,303	59.77	<.01
Race	1	432	2.78	N.S.
Sex	1	293	1.88	N.S.
Condition ^a	1	842	5.41	<.05
SES x Race	1	1,677	10.77	<.01
SES x Sex	1	216	1.39	N.S.
SES x Condition	1	55	.35	N.S.
Race x Sex	1	210	1.35	N.S.
Race x Condition	1	21	.13	N.S.
Sex x Condition	1	272	1.75	N.S.
SES x Race x Sex	1	948	6.09	<.05
SES x Race x Condition	1	510	3.28	N.S.
SES x Sex x Condition	1	0	0.00	N.S.
Race x Sex x Condition	1	222	1.43	N.S.
SES x Race x Sex x Condition	1	0	0.00	N.S.
Within	111	156		

^a"Condition" refers to mode of fifth grade Cloze test presentation, i.e., auditory or visual.

APPENDIX IX. FIRST AND FIFTH GRADE CLOZE TECHNIQUES:

ADMINISTRATION MANUALS, TEST BLANKS,

AND SCORING CRITERIA

A. Cloze Technique - First Grade Administration Manual

I. Materials: 1. Test record blank.

2. Approximate time: 10 minutes.

II. Procedure:

The Cloze Procedure will be administered individually and orally to all first grade subjects. The procedure is as follows: the examiner is seated at a table with the child. The examiner says:

"I WOULD LIKE TO PLAY A NEW GAME WITH YOU THAT I THINK YOU WILL LIKE. DO YOU KNOW HOW TO CLAP YOUR HANDS? SHOW ME HOW YOU CLAP YOUR HANDS? THAT'S VERY GOOD. NOW I WILL TELL YOU HOW TO PLAY THE GAME. I AM GOING TO READ TO YOU. YOU LISTEN CAREFULLY BECAUSE WHEN I STOP READING AND I CLAP MY HANDS THEN IT IS YOUR TURN. WHEN I STOP AND CLAP YOU TELL ME WHAT WORD YOU THINK COMES NEXT. YOU TELL ME ONE WORD ONLY AND THEN YOU CLAP YOUR HANDS AND I WILL READ SOME MORE. DON'T LET ME SURPRISE YOU. YOU HAVE TO LISTEN OR YOU WON'T BE READY FOR YOUR TURN. DO YOU UNDERSTAND? LET'S TRY ONE TOGETHER." (The examiner reads the sample Cloze sentence)

Sample: We hear with our ears and we see with our (clap) _____. The examiner should say the word "eyes" and then clap, along with the child. Try to have the child develop some spirit for the task. The first time the child answers with more than one word, repeat this instruction: "JUST TELL ME THE ONE WORD THAT YOU THINK COMES NEXT." Do not give the child any more help. If the child does not understand or hear a sentence, the examiner may read it one more time.

All of the child's responses must be recorded verbatim.

Cloze Technique - First Grade

Test Blank

Name _____ Sex _____ Grade _____ School _____ Date _____
Time _____ A.M. _____
P.M. _____ Duration of Test _____ Examiner _____ Score _____

GROWING UP

Boys grow up to be fathers and girls grow up to be _____.
What would you like to be when you grow ____? A lady who helps the
sick is called a _____. A doctor makes sick children _____.
When the children are good and behave the doctor gives them _____.
But sometimes he has to give them _____.

PUZZLES

A picture made up of many pieces is called a _____. We
keep each puzzle in a box so we don't lose the _____. When we
carry a puzzle we hold it straight and with two _____. We carry
it this way so the pieces won't fall _____. We can't do all the
puzzle if any of the pieces get _____. But, if we work carefully,
we can use the puzzle many _____.

SCHOOL

The teacher says "Good Morning" to the _____. Then the
teacher asks the children to hang up their _____. The teacher
waits for the children to settle in their _____. Before the work
starts the class does something _____. All the children and the
teacher stand _____. Then they all "Pledge allegiance to the _____."

First Grade Cloze: Scoring Criteria

Paragraph 1

<u>Absolute</u>	<u>Contextual</u>	<u>Grammatical</u>	
mothers mother	(Includes responses scored as "absolute")	girls grownups ladies sisters teachers womans women womens	(plural noun)
up			(adverb)
nurse	doctor	doctor grandmother person woman	(singular noun)
well	better fine healthy	better fine good happy healthy sick	(adjective)
candy	balloons ice cream lollipop a lollipop lollipops present a present surprise a toy toys a treat	balloons food ice cream lollipops medicine pills something toys treatment	(plural or collective noun)
medicine	aspirin a needle needles operations pills shot a shot shots	aspirin badges candy cookies food milk needles nothing operations pills shots toys	(plural or collective noun)

Paragraph 2

<u>Absolute</u>	<u>Contextual</u>	<u>Grammatical</u>	
puzzle	cut-out design mosaic	camera cut-out design drawing film frame king lot mosaic movie painting paper picture scrap	(singular noun beginning in a consonant)
pieces piece	parts puzzle puzzles	places parts puzzles	(plural noun)
hands			(plural noun)
out	apart down off	apart down now off	(adverb)
lost	broke broken missing	broken	(past participle)
times	days way ways	days ways	(plural noun)

Paragraph 3

class	children childrens peoples school students	children childrens peoples school students	(any plural noun or noun functioning as a collec- tive noun)
coats coaty	clothes clothing clothings	clothes clothing clothings	(plural or collective noun)

<u>Absolute</u>	<u>Contextual</u>	<u>Grammatical</u>	
seats seat	chair chairs line room rows	chairs clothes coats line room rows work	(plural noun or noun functioning as collec- tive noun)
special	different else first funny good important interesting new nice	bad different else first funny good important interesting new nice right	(adjective or adverb)
up	nice quiet quietly still straight together	down quiet quietly still straight together	(adverb)
flag		teacher	(singular noun)

B. Cloze Technique - Fifth Grade

Administration Manual: Auditory Presentation

I. Materials: tape recorder
tape
answer booklets
pencils

II. Approximate time: 30 minutes.

This technique is designed for group administration to 5-10 children with two testers in the room. In this technique the children attempt to fill in words left out of paragraphs spoken by teachers and children.

The material for this technique is one tape on which seven paragraphs appear. Each paragraph is recorded twice. During the first playing, the children just listen. At the second playing, the child writes words to fill in the pauses.

III. Instructions:

Upon entering the classroom, the examiner should introduce himself. Then he says: I WOULD LIKE YOU TO HELP ME TODAY. (Examiner should pass out papers.) BEFORE WE BEGIN, WOULD YOU PLEASE WRITE YOUR NAME WHERE IT SAYS "NAME." (Tester should hold up answer sheet and demonstrate and make certain everyone fills in this part correctly.) PLEASE CHECK WHETHER YOU ARE A BOY OR A GIRL. WRITE YOUR BIRTHDATE AND NEXT TO IT HOW OLD YOU ARE. WRITE YOUR CLASS AND SCHOOL NUMBER. (Allow a few minutes.) ARE WE READY TO BEGIN? VERY GOOD.

I HAVE A TAPE RECORDING HERE ON WHICH SOME ADULTS AND CHILDREN ARE SPEAKING. YESTERDAY I HAD AN ACCIDENT WITH THIS TAPE, AND SOME

OF THE WORDS WERE ERASED. NOW WE HAVE BEEN TRYING TO FILL IN THE MISSING WORDS. LET ME SHOW YOU WHAT I MEAN. LISTEN TO THE VOICE ON THE TAPE. YOU WILL HEAR THAT SOME OF THE WORDS ARE MISSING. LISTEN CAREFULLY! (Play the tape of the speech sample.) NOW I WOULD LIKE TO SHOW YOU HOW WE CORRECTED THIS TAPE. I AM GOING TO SAY THE WORDS THAT WE THINK ARE MISSING. EACH TIME WE COME TO A MISSING WORD I WILL RAISE MY HAND TO SIGNAL, AND I WILL TELL YOU THE WORD. I WOULD LIKE YOU TO WRITE THIS WORD DOWN ON THE PAPER. PUT ONLY ONE WORD ON EACH LINE. (Examiner should hold up the answer sheet and demonstrate as each word comes up.) VERY GOOD!

NOW WE HAVE STILL OTHER PEOPLE SPEAKING. I WOULD LIKE YOU TO HELP ME FIX THE REST OF THE TAPE. I WILL PLAY THE FIRST ONE ONCE, AND YOU LISTEN CAREFULLY. (Play the tape.)

NOW I WILL PLAY THE SAME TAPE AGAIN. EACH TIME YOU HEAR A WORD MISSING, PLEASE WRITE DOWN WHAT YOU THINK THE WORD SHOULD BE. EVEN IF YOU ARE NOT SURE, TAKE A GUESS AND FILL IN EACH MISSING WORD, LIKE BEFORE. I WILL RAISE MY HAND EACH TIME YOU ARE TO FILL IN A WORD. DO YOUR BEST AND TRY TO FILL IN EACH WORD. PUT ONLY ONE WORD ON EACH LINE. (One Examiner should be circulating the room. If any of the children seem to be absolutely stumped by one of the words, Examiner should tell them to leave a space and continue.)

When this paragraph is completed, go on to the next paragraph with the same instructions. The paragraphs occur on the tape as follows:

SAMPLE: The laborer earns \$1.50 _____ hour while the railroad _____ earns \$2.00 an hour. _____ much more is the _____ worker paid than the _____. We are comparing now. _____ you compare you subtract. _____ the wages of the _____ at \$1.50 with that _____ the railroad worker at _____.

1. When I grow up I _____ to be a kindergarten _____ because I like little _____ and I like my friends _____ school. They're very _____. If I need any _____ they help me. In _____ we do math and _____ studies, English. We used _____ go to the library _____ Wednesday.

2. During the winter we _____ in the snow. We _____ in each other's houses. _____ play lots of games. _____ day we play hopscotch _____. We have lots of _____ doing this. Sometimes we _____ on to the movies _____ Saturdays. Sunday I go away _____ my family. Monday we _____ school.

3. We are going to _____ drawing some pictures of _____ social studies work. You _____ draw Lewis and Clark _____ down the Missouri River. _____ could draw a map _____ the Louisiana Territory. It _____ also be a good _____ to have a complete _____ map of the United _____.

4. You should try to _____ up some money for _____ to spend. Therefore you will _____ be ready to have _____ for yourself when

you _____ money. You should not _____ or beg your mother
_____ money all of the _____. You should save up _____ own
money for yourself _____ spend.

5. Our class has groups _____ different experiments in
science. _____ group has four children in it. My group is _____
bones of the human _____. I think the group _____ reptiles is
going to _____ interesting. In about a _____ weeks each group is
_____ to report to the _____.

6. During hurricanes a big _____ blows from one direction.
_____ tornadoes the wind blows _____ and around. Now, what
_____ the wind blow around _____ around? It has something _____
do with the temperature _____ the air. Tornadoes start _____
temperatures in the air _____ changing very quickly and _____ air
comes into contact with cold air.

Cloze Technique - Fifth Grade

Administration Manual: Visual Presentation

- I. Materials: 1. test booklets
2. approximate time: 30 minutes.

II. Procedure:

This procedure is designed for individual or group administration. Upon entering the classroom the examiner should introduce himself. He then says: I WOULD LIKE TO PLAY A WORD GAME WITH YOU. FIRST YOU MUST GET ONE OF THESE BOOKLETS. (Pass out the booklets, which contain some paragraphs.) The examiner says: DO YOU HAVE A BOOKLET? ALL RIGHT. NOW, ON THE FIRST LINE, I WOULD LIKE YOU TO WRITE YOUR NAME, WHERE IT SAYS TO. THEN WRITE YOUR BIRTHDATE, YOUR AGE, YOUR CLASS, WHICH IS 5 ____; YOUR SCHOOL, WHICH IS P.S. _____. THEN, BACK ON THE TOP LINE, CHECK WHETHER YOU ARE A BOY OR A GIRL, AND WRITE THE DATE, WHICH IS _____. ON THE REST OF THE PAGES JUST WRITE YOUR NAME WHERE IT SAYS TO. (Allow a few minutes.) ARE WE READY TO BEGIN? GOOD. ON EACH PAGE OF THESE BOOKLETS THERE IS A PARAGRAPH. IN EACH PARAGRAPH THERE ARE MISSING WORDS. I WOULD LIKE YOU TO FILL IN EACH OF THE MISSING WORDS. BE SURE TO LOOK OVER THE WHOLE PARAGRAPH FIRST BEFORE YOU FILL IN THE MISSING WORDS. IF YOU AREN'T SURE OF THE WORD THAT BELONGS IN THE BLANK, TRY TO GUESS WHAT IT MIGHT BE. WORK ON ONE PARAGRAPH AT A TIME. REMEMBER TO LOOK THE WHOLE PARAGRAPH OVER FIRST AND TO PUT ONLY ONE WORD IN EACH BLANK. YOU CAN TAKE AS MUCH TIME AS YOU NEED. TRY TO GET THE RIGHT WORD AND DO NOT HURRY. WHEN YOU FINISH, JUST REMAIN QUIETLY IN YOUR SEAT. ARE THERE ANY QUESTIONS? (If a child asks about spelling, say: JUST DO THE BEST YOU CAN.) REMEMBER TO PUT ONLY ONE WORD IN EACH BLANK. BEGIN.

Fifth Grade Cloze: Scoring Criteria

Paragraph 1

Absolute

Contextual

Grammatical

(Includes
those responses
scored as "absolute")

want

going
hope
like
liked
would like
prefer

have
hope
prefer
want
would like

(verb agreeing
in number
with 1st
person singular
and implying
future tense)

teacher

leader
monitor

baby
child
leader
monitor
student
teacher

(singular
noun)

children
child
childs
childrens

boys
people

boys
childs
children
people
subjects
toys

(plural noun)

in

at

and
at
in

(preposition
or coordinate
conjunction)

nice

friendly
helpful
kind
smart

friendly
good
happy
helpful
kind
lovely
nice
smart

(any descrip-
tive adjective)

help

information
rules
thing
things

information
help
rules
school
thing
things
trouble
won (for 'one')

(any noun)

<u>Absolute</u>	<u>Contextual</u>	<u>Grammatical</u>	
school	class studies	case (idiom) class kindergarten school studies	(any noun)
social	spelling	do school social spelling	(adjective or verb agreeing in number with 1st person plural)
to		to	(preposition used as a sign of the infinitive mood)
on	every	every on	(preposition or adjective)
<u>Paragraph 2</u>			
play played	go	go play played	(verb of any tense which agrees in number with 1st person plural)
go went	ate play played sleep visit	ate go have look looked play played sleep visit went	(verb of any tense which agrees in number with the 1st person plural)
we	and children kids to	children kids we	(any personal pronoun in the nominative case except 3rd person singular or any plural noun)

<u>Absolute</u>	<u>Contextual</u>	<u>Grammatical</u>	
every	all each one school some	all each every no one some the	(any limiting adjective-- rather than descriptive adjective)
outside	game games a lot outdoor together too	alone a lot ball game games handball outdoor outside stick together too	(adverb or noun)
fun	games exercises	exercises fun games things	(any plural noun or abstract noun)
go went	walk	go walk went	(verb of any tense which agrees in number with 1st person plural which is not an auxiliary verb)
on	many some together	many on some together	(any preposi- tion; adverb; adjective which agrees in number with the noun)
with	from to visit	from onto to with	(preposition)
have had	go go to start	had have like play reach start	(transitive verb of any tense which agrees in number with 1st person plural)

Paragraph 3

Absolute

Contextual

Grammatical

be

practice
start
try

be
do
enjoy
have
learn
like
make
play
practice
show
start
study
try

(present
infinitive
form of the
verb)

our

some
the
your

famous
our
some
the
your

(any adjective)

could
can

may
must
will

can
could
did
do
even
may
must
will
would

(any auxiliary
verb which
agrees in
number with 2nd
person singular
or plural and
can be used with
the present
infinitive form
of the verb
"draw"; any
adverb)

sailing

coming
explore
going
riding
rowing
traveled
went

coming
going
riding
rowing
sailing
together

(any present
participle;
any adverb)

you

I
we

Clark
I
we
you

(any personal
pronoun in the
nominative
case or any
proper noun)

<u>Absolute</u>	<u>Contextual</u>	<u>Grammatical</u>	
of	about on showing	about down of on showing to	(preposition or present participle)
would will	can could is may should was	can could may should will would	(any auxiliary verb which agrees in number with 3rd person singular and can be used with the present infinitive form of the verb "be")
idea	background drawing map picture project thing	background drawing helper idea map picture project territory thing trip	(any singular noun)
outline	big clay colored drawn good history illustrated land picture relief scale school study wall survey	big clay colored completed drawing drawn good history home illustrated land outline page paper picture real relief scale school set	(any adjective or noun functioning as an adjective)

Absolute

Contextual

Grammatical

States
State

store
study
survey
wall
world

States
State

(any noun)

Paragraph 4

save

collect
earn
get
pick
raise (rise)

bring
collect
earn
get
make
pick
race
raise
save
work

(present
infinitive
form of the
verb)

yourself
you

later
me
tomorrow
us

later
me
money
Saturday
things
tomorrow
trips
Tuesday
us
you
yourself

(any reflexive
pronoun or any
personal
pronoun in the
objective case
or any noun)

always
always

all
already
also
really
soon
then

all
already
also
always
kindly
not
really
soon
then

(any adverb and
the indefinite
pronouns "each,"
"and," "all")

<u>Absolute</u>	<u>Contextual</u>	<u>Grammatical</u>	
some	enough it money plenty something	enough it money plenty ready saved some something there things	(any personal pronoun in the objective case; plural or collective nouns; or adverbs)
need needed	spend want	earn get have need save spend want	(any verb which agrees in number with 2nd person singular or plural and in the present or future tense)
steal	ask cry plead take whine	ask cry go have help plead send spend steal take try whine	(present infinitive form of the verb)
for		for	(preposition)
time times	day week	day money time times week	(any noun)
your you	plenty some	your	(any personal pronoun in the possessive case)
to (too)		to	(preposition needed as a sign of the infinitive mood)

Paragraph 5

Absolute

Contextual

Grammatical

of

and
do (to do)
doing
for
in
with

and
doing
for
in
of
with

(any
preposition;
any coordin-
ating conjunctio
any present
participle)

each

a
every
her
my
one
our
the
your

a
each
every
her
my
one
our
some
the
your

(any personal
pronoun in the
possessive case;
any indefinite
pronoun which
agrees with
"group" in
number;
articles)

in

to

in
on
to

(any
preposition)

studying
study

about
different
experimenting
for
on
the

about
all
animal
back
different
drawing
eight
experimenting
for
good
human
making
of
on
only
science
studying
the
two

(any present
participle or
preposition or
adjective or
adverb)

Absolute**Contextual****Grammatical**

body
bodies

being
group
man
people
person
race

being
body
bodies
group
man
people
person
race

(any noun)

studying
study
studied

about
doing
for
on

about
at
doing
for
making
of
on
studying
with

(any present
participle
or preposition)

be

get

be
get

(present
infinitive form
of any state of
being verb or
any verb which
pertains to
the senses)

few

couple
four
one (1)
two (2)
three (3)

few

(only the idiom
"few" which
agrees in
number with both
"a" and "weeks")

going

ready
suppose

first
going
having
ready
suppose

(any present
participle,
adverb,
adjective or
any past
participle
used in the
passive voice
with the verb
"is")

Absolute**Contextual****Grammatical****class****group
leader
other
room
school
teacher****class
experiments
facts
group
leader
room
school
subject
subjects
teacher****(any noun)****Paragraph 6****wind (wing)
winds****storm
tornadoes****storm
wind
wing****(any singular
noun or
collective noun)****during****in
with****by
during
in
to
with****(any preposition)****around
round****hard
in
swiftly
up****around
hard
here
in
round
swiftly
up****(any adverb)****makes
make****can
could
did
does
makes
must
shall
will
would****(any form of the
verb which
agrees in
number with the
3rd person
singular or any
auxiliary verb
which agrees
with the 3rd
person singular
and can be used
with the present
infinitive form
of the verb
"blow")**

<u>Absolute</u>	<u>Contextual</u>	<u>Grammatical</u>	
and		and	(any coordinate conjunction)
to		to	(preposition used as a sign of the infinitive mood)
of	and around in or	and around in of or outside	(any preposition or coordinating conjunction)
when	because by from with	because when where	(any subordinating conjunction)
are is was	begin start starts	are become begin start	(any verb agreeing in number with the 3rd person plural and in the present tense)
hot	some warm	cool fast hot quietly some soon the then warm windy	(any adjective or adverb; or subordinating conjunction)

APPENDIX X. ANALYSIS OF VARIANCE AND ANALYSIS OF
COVARIANCE CONTROLLING FOR IQ ON CLOZE DATA

APPENDIX TABLE 12.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ), Absolute Score, First Grade Cloze,
Teachers' Speech

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES	1	11.39	2.46	N.S.	1	5.00	1.07	N.S.
Race	1	8.12	1.75	N.S.	1	6.00	1.28	N.S.
Sex	1	.14	.03	N.S.	1	0.00	.00	N.S.
SES x Race	1	9.91	2.14	N.S.	1	8.00	1.71	N.S.
SES x Sex	1	9.14	1.97	N.S.	1	9.00	1.93	N.S.
Race x Sex	1	1.27	.27	N.S.	1	1.00	.22	N.S.
SES x Race x Sex	1	1.89	.41	N.S.	1	2.00	.43	N.S.
Within	56	4.69			55	4.67		

Note: For d.f. 1, 55: $F = 4.02$, $p = .05$; $F = 7.12$, $p = .01$.

APPENDIX TABLE 13.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ), Contextual Score,
First Grade Cloze, Teachers' Speech

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES	1	19.00	6.69	.05	1	3.00	1.18	N.S.
Race	1	7.00	2.46	N.S.	1	3.00	1.18	N.S.
Sex	1	10.00	3.52	N.S.	1	7.00	2.55	N.S.
SES x Race	1	1.00	.35	N.S.	1	1.00	.36	N.S.
SES x Sex	1	1.00	.35	N.S.	1	1.00	.36	N.S.
Race x Sex	1	.00	.00	N.S.	1	.00	.00	N.S.
SES x Race x Sex	1	.00	.00	N.S.	1	.00	.00	N.S.
Within	56	2.84			55	2.74		

Note.--For d.f. 1, 55: F = 4.02, p = .05; F = 7.12, p = .01.

APPENDIX TABLE 14.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ), Grammatical Score,
First Grade Cloze, Teachers' Speech

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES	1	2.00	.69	N.S.	1	.00	.00	N.S.
Race	1	2.00	.69	N.S.	1	1.00	.35	N.S.
Sex	1	11.00	3.82	N.S.	1	9.00	3.14	N.S.
SES x Race	1	5.00	1.74	N.S.	1	5.00	1.74	N.S.
SES x Sex	1	1.00	.35	N.S.	1	1.00	.35	N.S.
Race x Sex	1	1.00	.35	N.S.	1	1.00	.35	N.S.
SES x Race x Sex	1	2.00	.67	N.S.	1	2.00	.70	N.S.
Within	56	2.88			55	2.87		

Note.--For d.f. 1, 55: $F = 4.02$, $p = .05$; $F = 7.12$, $p = .01$.

APPENDIX TABLE 15.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ), Absolute Score, Fifth Grade Cloze,
Teachers' Speech

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES	1	64.29	10.56	.01	1	1.35	.26	N.S.
Race	1	31.02	5.09	.05	1	15.83	3.01	N.S.
Sex	1	14.17	2.33	N.S.	1	25.15	4.79	<.05
Condition ^a	1	376.89	61.89	.01	1	282.82	53.87	<.01
SES x Race	1	53.0	8.71	.01	1	16.03	3.05	N.S.
SES x Sex	1	11.58	1.90	N.S.	1	20.15	3.84	N.S.
SES x Condition	1	.34	.06	N.S.	1	1.31	.25	N.S.
Race x Sex	1	.06	.01	N.S.	1	.07	.01	N.S.
Race x Condition	1	.19	.03	N.S.	1	.03	.01	N.S.
Sex x Condition	1	1.02	.17	N.S.	1	.07	.01	N.S.
SES x Race x Sex	1	.00	.00	N.S.	1	9.03	1.72	N.S.
SES x Race x Condition	1	6.02	.99	N.S.	1	.00	.00	N.S.
SES x Sex x Condition	1	5.52	.91	N.S.	1	5.96	1.14	N.S.
Race x Sex x Condition	1	2.71	.44	N.S.	1	.22	.04	N.S.
SES x Race x Sex x Condition	1	2.97	.49	N.S.	1	8.67	1.65	N.S.
Within	111	6.09			110	5.25		

^a"Condition" refers to mode of presentation, i.e., auditory or visual.

Note.--For d.f. 1, 110: F = 3.94, p = .05; F = 6.90, p = .01.

**APPENDIX TABLE 16.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ), Contextual Score, Fifth Grade Cloze,
Teachers' Speech, Visual Presentation**

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES	1	84.89	9.55	.01	1	8.35	1.06	N.S.
Race	1	3.88	.44	N.S.	1	.10	.01	N.S.
Sex	1	6.10	.69	N.S.	1	19.16	2.44	N.S.
SES x Race	1	2.78	.31	N.S.	1	.51	.06	N.S.
SES x Sex	1	14.50	1.63	N.S.	1	23.33	2.97	N.S.
Race x Sex	1	3.16	.36	N.S.	1	2.98	.38	N.S.
SES x Race x Sex	1	8.82	.99	N.S.	1	6.38	.81	N.S.
Within	57	8.89			56	7.85		

Note.--For d.f. 1, 55: $F = 4.02$, $p = .05$; $F = 7.12$, $p = .01$.

**APPENDIX TABLE 17.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ), Grammatical Score, Fifth Grade Cloze,
Teachers' Speech, Visual Presentation**

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES	1	52.20	6.13	.05	1	.39	.05	N.S.
Race	1	33.95	3.99	N.S.	1	5.06	.71	N.S.
Sex	1	37.37	4.39	.05	1	51.13	7.17	<.01
SES x Race	1	3.09	.36	N.S.	1	.47	.07	N.S.
SES x Sex	1	26.90	3.16	N.S.	1	40.21	5.64	<.05
Race x Sex	1	2.61	.30	N.S.	1	2.43	.34	N.S.
SES x Race x Sex	1	12.99	1.53	N.S.	1	8.10	1.14	N.S.
Within	57	8.51			56	7.13		

Note.--For d.f. 1, 55: $F = 4.02$, $p = .05$; $F = 7.12$, $p = .01$.

APPENDIX TABLE 18.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ), Absolute Score, Fifth Grade Cloze,
Children's Speech

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES	1	98.29	44.17	.01	1	15.16	7.15	<.01
Race	1	.21	.09	N.S.	1	.37	.17	N.S.
Sex	1	33.40	15.01	.01	1	43.90	20.71	<.01
P ^a Class	1	5.94	2.67	N.S.	1	5.94	2.80	N.S.
PRace	1	15.49	6.96	.01	1	15.49	7.31	<.01
PSEX	1	112.44	50.53	.01	1	50.53	23.83	<.01
Condition ^b	1	952.15	427.91	.01	1	820.15	386.86	<.01
SES x Race	1	4.42	1.99	N.S.	1	.00	.00	N.S.
SES x Sex	1	36.78	16.53	.01	1	46.20	21.79	<.01
SES x PClass	1	26.63	11.97	.01	1	26.63	12.56	<.01
SES x PRace	1	.18	.08	N.S.	1	.18	.08	N.S.
SES x PSEX	1	2.31	1.04	N.S.	1	2.31	1.09	N.S.
SES x Condition	1	.24	.11	N.S.	1	.77	.36	N.S.
Race x Sex	1	1.09	.49	N.S.	1	3.22	1.52	N.S.
Race x PClass	1	.09	.04	N.S.	1	.09	.04	N.S.
Race x PRace	1	6.98	3.14	N.S.	1	6.98	3.29	N.S.
Race x PSEX	1	10.34	4.65	.05	1	10.34	4.88	<.05
Race x Condition	1	.63	.28	N.S.	1	.30	.14	N.S.

APPENDIX X, TABLE 18 continued

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
Sex x PClass	1	.51	.23	N.S.	1	.51	.24	N.S.
Sex x PRace	1	3.15	1.42	N.S.	1	3.15	1.49	N.S.
Sex x PSex	1	1.32	.59	N.S.	1	1.32	.62	N.S.
Sex x Condition	1	.24	.11	N.S.	1	1.80	.85	N.S.
PClass x Condition	1	10.30	4.63	.05	1	10.80	4.86	<.05
PRace x Condition	1	21.67	9.74	.01	1	21.67	10.22	<.01
PSex x Condition	1	7.91	3.55	N.S.	1	7.91	3.73	N.S.
SES x Race x Sex	1	--	.91	N.S.		--	--	--
SES x Race x Condition	1	--	.07	N.S.		--	--	--
SES x Race x PClass	1	--	.20	N.S.		--	--	--
SES x Race x PRace	1	--	4.03	.05		--	--	--
SES x Race x PSex	1	--	.01	N.S.		--	--	--
SES x Sex x Condition	1	--	1.71	N.S.		--	--	--
SES x Sex x PClass	1	--	1.73	N.S.		--	--	--
SES x Sex x PRace	1	--	.48	N.S.		--	--	--
SES x Sex x PSex	1	--	.19	N.S.		--	--	--
Race x Sex x Condition	1	--	.01	N.S.		--	--	--

APPENDIX X, TABLE 18 continued

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
Race x Sex x PClass	1	--	.01	N.S.		--	--	--
Race x Sex x PRace	1	--	1.47	N.S.		--	--	--
Race x Sex x PSex	1	--	.10	N.S.		--	--	--
Within	444	2.23			443	2.12		

^a"P" refers to the Cloze paragraphs of children's speech.

^b"Condition" refers to mode of presentation, i.e., auditory or visual.

Notes.--d.f. 1, 400: $F = 3.86$, $p = .05$; $F = 6.70$, $p = .01$.

The computer program used for these analyses was in a preliminary stage. Also, the incomplete design resulted in confounding on higher order interactions. For these two reasons higher order interactions were examined by a method of contrasts which yields a final F without the preliminary sums of squares required in a covariance analysis.

APPENDIX TABLE 19.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ), Contextual Score, Fifth Grade Cloze,
Children's Speech, Visual Presentation

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES	1	33.24	14.02	.01	1	1.43	.65	N.S.
Race	1	.03	.01	N.S.	1	1.09	.49	N.S.
Sex	1	6.99	2.95	N.S.	1	17.19	7.78	<.01
PClass	1	.75	.32	N.S.	1	.75	.34	N.S.
PRace	1	1.86	.79	N.S.	1	1.86	.84	N.S.
PSex	1	23.40	9.87	.01	1	23.40	10.58	<.01
SES x Race	1	.54	.23	N.S.	1	.04	.02	N.S.
SES x Sex	1	12.79	5.40	.05	1	18.88	8.54	<.01
Race x Sex	1	.02	.01	N.S.	1	.02	.01	N.S.
SES x PClass	1	.89	.37	N.S.	1	.89	.40	N.S.
SES x PRace	1	.68	.29	N.S.	1	.68	.29	N.S.
SES x PSex	1	.26	.11	N.S.	1	.26	.12	N.S.
Race x PClass	1	.73	.31	N.S.	1	.73	.31	N.S.
Race x PRace	1	2.53	1.07	N.S.	1	2.53	1.14	N.S.
Race x PSex	1	.30	.13	N.S.	1	.30	.14	N.S.
Sex x PClass	1	.28	.12	N.S.	1	.28	.13	N.S.
Sex x PRace	1	.07	.03	N.S.	1	.07	.03	N.S.
Sex x PSex	1	.16	.07	N.S.	1	.16	.07	N.S.
SES x Race x Sex	1	--	3.31	N.S.	--	--	--	--

APPENDIX X, TABLE 19 continued

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES x Race x PClass	1	--	.77	N.S.	--	--	--	--
SES x Race x PRace	1	--	.20	N.S.	--	--	--	--
SES x Race x PSex	1	--	.30	N.S.	--	--	--	--
SES x Sex x PClass	1	--	.33	N.S.	--	--	--	--
SES x Sex x PRace	--	--	.06	N.S.	--	--	--	--
SES x Sex x PSex	--	--	.62	N.S.	--	--	--	--
Race x Sex x PClass	--	--	.19	N.S.	--	--	--	--
Race x Sex x PRace	--	--	.09	N.S.	--	--	--	--
Race x Sex x PSex	--	--	1.43	N.S.	--	--	--	--
Within	228	2.37			227	2.21		

Notes.--For d.f. 1, 200: $F = 3.89$; $p = .05$; $F = 6.70$, $p = .01$.

The computer program used for these analyses was in a preliminary stage. Also, the incomplete design resulted in confounding on higher order interactions. For these two reasons, higher order interactions were examined by a method of contrasts which gives you a final F without the preliminary sums of squares required for a covariance analysis.

APPENDIX TABLE 20.--Analysis of Variance and Analysis of Covariance
(Controlling for IQ), Grammatical Score, Fifth Grade Cloze,
Children's Speech, Visual Presentation

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES	1	30.93	22.32	.01	1	9.85	7.24	<.01
Race	1	4.50	3.25	N.S.	1	2.52	1.85	N.S.
Sex	1	1.04	.75	N.S.	1	2.62	1.95	N.S.
PClass	1	.98	.71	N.S.	1	.98	.72	N.S.
PRace	1	43.00	31.03	.01	1	43.00	31.62	<.01
PSEX	1	5.55	4.01	.05	1	5.55	4.08	<.05
SES x Race	1	.78	.56	N.S.	1	1.36	1.00	N.S.
SES x Sex	1	4.60	3.32	N.S.	1	5.99	4.40	<.05
Race x Sex	1	1.51	1.09	N.S.	1	1.47	1.08	N.S.
SES x PClass	1	4.78	3.45	N.S.	1	4.78	3.51	N.S.
SES x PRace	1	7.70	5.50	.05	1	7.70	5.66	<.05
SES x PSEX	1	.04	.03	N.S.	1	.04	.03	N.S.
Race x PClass	1	.95	.69	N.S.	1	.95	.70	N.S.
Race x PRace	1	9.00	6.50	.05	1	9.00	6.62	<.05
Race x PSEX	1	.34	.25	N.S.	1	.34	.25	N.S.
Sex x PClass	1	.02	.01	N.S.	1	.02	.01	N.S.
Sex x PRace	1	.01	.01	N.S.	1	.01	.01	N.S.
Sex x PSEX	1	2.61	1.89	N.S.	1	2.61	1.92	N.S.
SES x Race x Sex	--	---	6.19	.05	--	--	--	--

APPENDIX X, TABLE 20 continued

Source	Analysis of Variance				Analysis of Covariance			
	d.f.	Mean Square	F	p	d.f.	Mean Square	F	p
SES x Race x PClass	--	--	.15	N.S.	--	--	--	--
SES x Race x PRace	--	--	.17	N.S.	--	--	--	--
SES x Race x PSex	--	--	1.41	N.S.	--	--	--	--
SES x Sex x PClass	--	--	1.05	N.S.	--	--	--	--
SES x Sex x PRace	--	--	.09	N.S.	--	--	--	--
SES x Sex x PSex	--	--	2.42	N.S.	--	--	--	--
Race x Sex x PClass	--	--	.03	N.S.	--	--	--	--
Race x Sex x PRace	--	--	.58	N.S.	--	--	--	--
Race x Sex x PSex	--	--	1.06	N.S.	--	--	--	--
Within	228	1.39			227	1.36		

Notes.--For d.f. 1, 200: $F = 3.89$; $p = .05$; $F = 6.70$, $p = .01$.

The computer program used for these analyses was in a preliminary stage. Also, the incomplete design resulted in confounding on higher order interactions. For these two reasons, higher order interactions were examined by a method of contrasts which yields a final F without the preliminary sums of squares required for a covariance analysis.

APPENDIX XI. MEAN SCORES, BY SUBGROUPS, ON
CLOZE MEASURES NOT REPORTED IN TEXT

APPENDIX TABLE 21.--Means and Standard Deviations, First Grade
Cloze Measures, Teachers' Speech
(N = 64; N per Subgroup = 8)

Group ^a	<u>SES I</u>				<u>SES III</u>			
	<u>Male</u>		<u>Female</u>		<u>Male</u>		<u>Female</u>	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
<u>Absolute Score</u>								
N	9.62	3.07	8.75	2.19	10.75	1.98	10.88	1.55
W	11.12	2.47	10.25	1.17	10.12	2.30	11.38	1.92
<u>Grammatical Score</u>								
N	15.25	1.91	14.88	1.88	16.75	1.03	15.12	2.03
W	16.38	1.41	15.62	1.60	16.12	1.64	15.50	1.85
<u>Contextual Score</u>								
N	14.88	1.73	14.00	2.33	16.25	0.71	15.38	1.06
W	15.75	1.75	15.00	1.41	16.50	1.69	15.88	2.17

^a "N" and "W" refer to Negro and white subgroups, respectively.

APPENDIX TABLE 22.--Means and Standard Deviations, Fifth Grade Cloze
Measures, Teachers' Speech

Group ^a	<u>SES I</u>						<u>SES III</u>					
	<u>Male</u>			<u>Female</u>			<u>Male</u>			<u>Female</u>		
	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
<u>Absolute Score, Auditory Presentation</u>												
N	7	4.43	2.51	8	6.38	2.67	10	5.00	2.94	8	5.25	1.28
W	8	4.50	2.20	8	4.75	2.19	6	7.50	1.64	7	8.14	2.27
<u>Absolute Score, Visual Presentation</u>												
N	10	7.70	2.45	14	8.57	2.50	3	9.67	1.15	6	8.33	1.75
W	8	7.62	3.38	8	9.38	3.16	8	11.00	2.62	8	10.75	2.25
<u>Contextual Score, Visual Presentation</u>												
N	10	12.90	3.32	14	13.29	3.34	3	15.33	3.21	6	15.00	1.55
W	8	11.88	3.80	8	14.63	2.07	8	16.38	2.39	8	15.75	2.92
<u>Grammatical Score, Visual Presentation</u>												
N	10	13.20	3.42	14	13.93	2.68	3	15.33	3.21	6	15.67	1.21
W	8	13.00	4.00	8	17.12	1.36	8	17.50	3.30	8	17.25	2.87

^a"N" and "W" refer to Negro and white subgroups, respectively.

APPENDIX TABLE 23.--Means and Standard Deviations, Absolute Score,
Fifth Grade Cloze, Children's Speech

<u>Speech Samples</u>									
Group ^a	<u>SES III NG</u>			<u>SES I WG</u>		<u>SES I NB</u>		<u>SES III WB</u>	
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
<u>Auditory Presentation</u>									
SES I									
NB	7	2.14	1.57	2.57	.97	3.43	1.13	2.57	1.99
NG	8	4.62	1.06	3.75	1.39	4.00	1.31	3.88	2.75
WB	8	2.50	1.20	3.13	1.73	2.00	1.31	3.00	1.20
WG	8	3.75	1.28	4.88	2.03	2.50	.93	3.00	2.07
SES III									
NB	10	5.70	.82	3.70	1.89	3.50	1.71	4.10	2.42
NG	8	4.00	1.41	3.63	1.51	3.00	1.41	3.75	1.67
WB	6	5.33	1.03	4.33	.52	2.83	1.17	3.67	1.03
WG	7	5.57	1.27	4.43	1.27	2.86	.69	4.86	1.57

^a"N," "W," "B," and "G" refer to the various subgroup combinations of Negro and white boys and girls, respectively.

APPENDIX XI, TABLE 23 continued

Group	<u>Speech Samples</u>								
	<u>SES III NG</u>			<u>SES I WG</u>		<u>SES I NB</u>		<u>SES III WB</u>	
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
<u>Visual Presentation</u>									
SES I									
NB	10	6.00	1.82	5.80	1.32	5.80	1.32	4.60	1.43
NG	14	7.50	1.16	6.29	1.26	6.21	1.25	5.28	1.94
WB	8	6.50	1.77	6.38	1.99	5.50	1.51	3.38	1.99
WG	8	6.88	2.03	7.00	.53	6.00	1.60	6.13	.99
SES III									
NB	3	8.00	.00	7.00	1.73	5.67	.57	6.67	1.15
NG	6	7.83	2.14	7.00	.89	6.67	.52	5.83	1.47
WB	8	8.38	1.19	6.38	.92	7.13	1.24	6.00	1.20
WG	8	8.00	1.41	7.75	1.28	6.25	1.91	6.13	1.24

APPENDIX TABLE 24.--Means and Standard Deviations, Contextual Score,
Fifth Grade Cloze, Children's Speech,
Visual Presentation

Speech Samples									
Group ^a	SES III NG			SES I WG		SES I NB		SES III WB	
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
SES I									
NB	10	8.70	1.42	8.50	1.27	8.00	1.33	7.30	1.64
NG	14	9.07	1.21	8.86	1.02	8.64	1.39	7.86	2.03
WB	8	8.13	1.88	7.88	2.03	7.63	2.44	7.75	1.98
WG	8	8.75	3.54	9.38	0.92	8.63	1.19	8.50	1.31
SES III									
NB	3	9.33	1.15	9.67	0.57	8.67	0.57	8.67	1.53
NG	6	9.17	2.04	9.00	1.26	9.17	0.98	9.00	1.10
WB	8	9.75	0.46	9.50	0.53	9.13	0.84	9.00	0.53
WG	8	9.38	1.41	9.38	0.74	8.50	2.27	8.75	0.88

^a"N," "W," "B," and "G" refer to the various subgroup combinations of Negro and white boys and girls, respectively.

APPENDIX TABLE 25.--Means and Standard Deviations, Grammatical Score,
Fifth Grade Cloze, Children's Speech,
Visual Presentation

Group ^a	Speech Samples								
	SES III NG			SES I WG		SES I NB		SES III WB	
	N	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
SES I									
NB	10	8.80	0.63	8.00	1.05	9.00	0.94	7.80	1.23
NG	14	9.14	1.41	8.21	1.05	9.00	0.88	6.93	1.82
WB	8	8.50	1.69	7.75	1.91	9.00	1.07	7.63	2.20
WG	8	9.62	0.52	9.25	0.88	9.25	0.88	8.63	1.41
SES III									
NB	3	10.00	0	9.33	1.15	9.33	0.57	8.00	0
NG	6	9.83	0.41	8.50	1.05	9.50	0.84	9.17	0.41
WB	8	9.88	0.35	9.25	0.71	9.50	0.75	9.50	0.53
WG	8	9.38	1.19	9.38	0.92	8.75	1.91	9.00	1.07

^a"N," "W," "B," and "G" refer to the various subgroup combinations of Negro and white boys and girls, respectively.

APPENDIX TABLE 26.--Means and Standard Deviations, Absolute,
Contextual, and Grammatical Scores, Fifth Grade Cloze,
Children's Speech, Visual Presentation

Scores	<u>Speech Samples^a</u>							
	<u>SES III NG</u>		<u>SES I WG</u>		<u>SES I NB</u>		<u>SES III WB</u>	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Absolute	7.29	1.70	6.60	1.34	6.17	1.39	5.35	1.73
Contextual	9.15	1.37	8.94	1.22	8.51	1.55	8.23	1.58
Grammatical	9.29	1.10	8.60	1.23	9.12	1.04	8.18	1.62

^a"N," "W," "B," and "G" refer to the various subgroup combinations of Negro and white boys and girls, respectively.

Note:--All means were computed on an N of 65, the total number of subjects who received the fifth grade visual mode of the Cloze presentation.

APPENDIX XII. GLOSSARY OF TERMS

1. **Clown Technique:** a task used to obtain spontaneous speech samples from children at the first grade level. Children are asked to speak to the clown. The child's fluency is rewarded by the examiner who lights up the clown's nose when the child verbalizes.
2. **Cloze Technique:** By deleting every nth word from a verbal passage and substituting blank spaces, a cloze exercise is constructed. An individual is instructed to fill in the missing words; the responses are an indication of the effectiveness of the communication.
3. **Expressive Language:** Expressive language consisted of verbalizations elicited from the children in a relatively unstructured speech reinforcement situation.
4. **Receptive Language:** Receptive language was language measured by the children's single word constructed responses to a highly structured task requiring the completion of sentences.
5. **Rocket Technique:** a task used to obtain spontaneous speech samples from children at the 5th grade level. The display consists of a rocket and a moon; as the child verbalizes he is rewarded by the gradual ascent of the rocket toward the moon.
6. **TTR:**
$$\frac{\text{Number of different words (Type)}}{\text{Total number of words (Token)}} = \text{TTR}$$

A ratio which attempts to measure richness of vocabulary.

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SUMMARY

**COMMUNICATION OF INFORMATION IN THE ELEMENTARY
SCHOOL CLASSROOM**

**Martin Deutsch
Alma Maliver
Bert Brown
and
Estelle Cherry**

**Institute for Developmental Studies
Department of Psychiatry
New York Medical College
106th Street and 5th Avenue
New York 29, New York**

**Cooperative Research Project No. 908
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¹
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BACKGROUND

Language is a central factor in school performance, both in the major interpersonal communication function of language, and in its intrapersonal mediational function in problem solving. Nearly all children in a given city go to a school system reflecting the orientation of the dominant socio-cultural group, even though various subcultures use language differently with respect to children. Whether the different language atmospheres are based on cultural or socioeconomic factors, they result for children in both differential acquisition of language facility and in variations in performance on language-related tasks. Primary here are the language requirements of the school as they relate to communication and comprehension and, eventually, to such specific skills as reading.

Recognizing that there are socially determined differences in children's language patterns raises the question of what their influence is on the learning process. It would seem desirable to know more about the structure of children's language, the relationship of speech patterns to intelligence test and achievement scores, and the interrelationships among some of the components of children's language patterns. One way of accomplishing this would be to reduce to a minimum the inhibiting or facilitating influence of the teacher or tester in the situation in which expressive language samples are obtained. Another method would be to use the dialect of each child's own group as the stimulus material to measure his language performance. Both these methods were used in the present study in

which the purpose was to evaluate children's abilities to express themselves meaningfully and to comprehend the language of their teacher and peers. The study represented an effort to survey the language skills of the intellectually normal but socially disadvantaged child. While particular emphasis was placed on such expressive language skills as productivity, oral vocabulary, and sentence complexity and length, the study included an evaluation of receptive language skills through the assessment of the child's ability to comprehend language.

OBJECTIVES

The research reported herein was designed to explore the relationships between background factors and certain linguistic skills in children. Included were both expressive and receptive language studies.

The major objectives of the study of expressive language were to evaluate the expressive linguistic skills of children of diverse social and ethnic backgrounds. Samples of children's continuous speech were evaluated for both their formal and structural characteristics and for their content.

The primary objectives of the study of receptive speech in children were to evaluate the extent to which information is successfully communicated from teachers to pupils of diverse social backgrounds and the extent of effective communication among children of diverse social backgrounds.

In this investigation of children's language, expressive language samples consisted of verbalizations elicited from the children in a relatively unstructured speech reinforcement situation. Receptive language was measured by the children's single word constructed responses on a highly structured task requiring the completion of sentences.

The subjects in the research included Negro and white boys and girls of two age levels and of varying social class backgrounds, in order to permit investigations of the relationship of these demographic and developmental factors to various linguistic abilities. These evaluations constituted further major objectives of the research.

PROCEDURE

A. Subjects

Negro and white boys and girls were selected from the first and fifth grade classes of 12 schools of New York City. All subjects of the Expressive Language Study received the Wepman Auditory Discrimination Test and fifth grade subjects also received the Gates Advanced Primary Reading Test. The social class status of each subject was evaluated by means of the Index of Socioeconomic Status, a rating scale developed at the Institute for Developmental Studies which classifies socioeconomic status according to the occupation and educational background of the family breadwinner. Three social class levels were represented in the Expressive Language sample of 167 children: SES I, lower class; SES II, intermediate class;

SES III, middle class. The Receptive Language sample, consisting of 191 subjects, employed SES groups I and III only. Lorge-Thorndike Intelligence Tests were administered to all the children of both studies.

B. Techniques Employed

1. The Clown and Rocket Techniques

The Clown and Rocket tasks, for the first and fifth grader, respectively, of the Expressive Language Study, were designed to elicit relatively spontaneous speech on any topic selected by the child. The first grade child was read a story about Happy the Clown and was then introduced to Happy, a papier maché head of a clown, and asked to play a game with the clown. A microphone was placed around the child's neck and then he was seated directly in front of the clown. The clown spoke to the child by means of a hidden tape recording and asked to play a game with him. The child was told he would receive a prize if he played the game well and that when the clown was happy his nose would light up. The clown's nose was lighted by the examiner, by means of apparatus out of the child's sight, only when the child spoke, thus providing immediate reward of reinforcement for the desired response. The Rocket technique was, in effect, an "upward extension" of the Clown test for the older children. The motivating principle was that a rocket was designed to move closer and closer to a moon as the child spoke. For both age groups, five minutes of the child's response

to the speech task was recorded.

The linguistic analysis of the Clown and Rocket data consisted of measures of total verbal output, the four major parts of speech, sentence length, number of sentences formed, number of dependent clauses, number of all clauses, maze words, extraneous words, and type-token ratios (measures of range of vocabulary).

The content analysis of the Clown and Rocket data was based on a list of topics and subtopics derived empirically from the taped protocols of the children's speech. Examples of the content categories and subcategories used are: "School," "School Studies," "School Routines," "Teacher Identification" (e.g., "My teacher's name is ____."), "Teacher Interaction" (e.g., "My teacher is nice to me."), "Family," "Hobbies," "Reading," and "Interaction with Examiner."

2. The Cloze Technique

Adaptations of cloze technique passages were prepared for the first and fifth grade Receptive Language Study samples. Typically, a cloze passage is constructed by deleting every nth word (usually the fifth), and the mutilated passage is then presented in written form to the subject, who writes in the deleted word. Since a typical cloze passage would be too difficult a task for a first grader, a simple procedure was devised. Verbatim samples of first grade teachers' continuous speech were taped in classrooms during typical lessons. From these samples, three paragraphs, each

containing six sentences, were selected. Instead of deleting every fifth word, the final word was omitted. Sentences were read to each child individually by the examiner, who instructed the child to say the missing word whenever the examiner gave the signal by clapping her hands.

For the fifth graders, two paragraphs, of approximately fifty words each, were selected from taped fifth grade teachers' speech and prepared in traditional fashion by deleting every fifth word. The paragraphs were then recorded by Institute personnel with the appropriate words deleted for auditory presentation and presented to approximately half the fifth grade sample. The same paragraphs were also prepared in written form and presented to the balance of the fifth grade group. The auditory form was presented to groups of five to eight children; the written form was presented to groups of twelve to fifteen children. The same method was used to develop a children's speech cloze task, with the paragraphs having been selected from the tape recordings of speech elicited by means of the Rocket technique described above.

Three scores were developed for the first and fifth grade cloze responses: a) Absolute score for insertions identical to the deletion, including insertions of the right word with altered grammatical structure, e.g., "child" for "children;" b) Contextual score for insertions either identical to the original deletion or insertions which maintained the meaning of the paragraph; c) Grammatical score for insertions which followed the grammatical

construction of the original deletion regardless of whether the meaning of the passage was maintained. Each test response was evaluated according to each of the three scores except in the case of the fifth grade auditory presentation where only the Absolute score was used.

C. Statistical Analysis

Correlation analysis was applied to the linguistic data of the Clown and Rocket technique in order to establish the interrelationships among the language measures, intelligence, reading, and auditory discrimination test scores, and demographic characteristics. Factor analysis was then used to reduce the correlation matrices of each grade level to their basic factorial components. This procedure resulted in the isolation of three definable factors for each grade. Certain major defining variables within the factors were selected for analyses of variance and covariance (controlling for IQ score).

The content of the Clown and Rocket protocols was analyzed according to the chi square method. A technique for three-way chi square analysis which partitions the chi square in a manner analagous to the partitioning of the variance in analysis of variance was used for examination of the topical and subtopical categories. The method yielded the effects due to the main classifying variables (grade level, sex, race, and social class level), as well as the effects due to various combinations (interactions) of the variables.

Analyses of variance and covariance (controlling for IQ score) were used to evaluate, at each grade level, the relationships between the children's responses to the Cloze technique and the sex, race, and social class variables.

RESULTS

The major findings of the Expressive and Receptive Language Studies may be summarized as follows:

1. While fifth grade children were found to be more productive on every language measure than first graders were, in general the proportion of any language score to the total output of speech was the same at both grade levels.
2. Three relatively discrete factors of interrelated language and/or demographic variables were obtained for each of the two age groups studied. These clusters indicated that: a) Many of the traditional language measures yielded overlapping results owing to their high degree of dependence on total speech productivity. b) Range of oral vocabulary tended to be relatively independent of other language measures and showed a positive relationship to social class level. While the higher social class group demonstrated a wider range of oral vocabulary than did the lower class group, this relationship was not maintained when differences in IQ score were controlled. c) The mean sentence length measure was related to social class level among younger children but not among the older children. Lower class first graders tended to use shorter sentences than a comparable age group of higher social class subjects.

d) At the fifth grade level, the race variable was related to intelligence, reading skill, and sound discrimination test scores but not to the language measures of this research. At the first grade level, the race variable was related to neither the language nor the other test measures.

3. The content of children's speech obtained in a relatively unstructured adult-child testing situation was, in general, not significantly influenced by variables of sex, race, or social class level. Older children, who talked considerably more than the younger children did within a specified period of time, were found to cover a wider range of topics rather than to discuss any one topic more fully than did the younger group.

4. The results of this research, compared with those of previous studies, suggested that the appearance of sex differences in language performance is highly dependent on the age and social class level of the subject and on the specific linguistic skill measured.

5. Where social class or racial differences in language performance appeared, they were usually found in conjunction with significant differences in performance on the Lorge-Thorndike IQ Tests. The language performance of fifth grade children, compared with first grade subjects, was somewhat more sensitive to the influence of social class and race variables.

CONCLUSIONS AND IMPLICATIONS

The findings of this broad study of expressive and receptive

language in children have the following implications for the educator:

1. Children disadvantaged by conditions related to social class status and/or minority group membership require special language training in language areas such as vocabulary development, general ease in self-expression leading to lengthy but meaningful verbalization, greater exactness in sound discrimination, and precision in the use of language.

2. This research shows the close relationship between intelligence, as measured by standardized IQ tests, and language skills. Previous studies suggest that improving language skills can raise IQ scores.

3. Different subgroups of first grade children tend to be more similar in their general language functioning than are fifth grade children. It is therefore important to emphasize language development at as early an age as possible.

Suggestions for further research arising from the current study include the following:

1. The children who participated in the present investigation of expressive language were included in the research project of a larger study, and parent interview data have been collected for each child. To gain further insights into the conditions related to higher IQ and language scores, it would be valuable to investigate these data from pupils of the lowest social class group who scored highest and lowest on the language variables.

2. Longitudinal studies utilizing the Clown technique with the same children at different levels of their development, comparing the results to their general classroom and academic functioning, would serve to clarify the functions measured by the device.

3. Since the content of the expressive language samples of all the children was strikingly similar, it would be desirable to devise test situations which simultaneously maximize idiosyncratic content and lend themselves to standardized procedures.

4. Further analysis of the current expressive language samples might include the measurement of speech pauses defined by Bernstein (1962) as "hesitation phenomena."

5. Further studies of expressive language behavior should include assessments of the influence of the examiner's sex, race, and social class characteristics on the children's responses.

BIBLIOGRAPHY

There are 93 references listed in the final report.